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TAXONOMIC STUDIES OF THE GENUS *PHYMATURUS* (IGUANIA: LIOLAEMIDAE): DESCRIPTION OF FOUR NEW SPECIES

Fernando Lobo[1,3], Cristian Abdala[2], and Soledad Valdecantos[1]

[1] *IBIGEO (Instituto de Bio y Geociencias del NOA), CONICET, Universidad Nacional de Salta. Avda. Bolivia 5150. 4400, Salta, Argentina.*
[2] *Instituto de Herpetología, Fundación Miguel Lillo. CONICET, Universidad Nacional de Tucumán. Miguel Lillo 251. 4000, Tucumán, Argentina.*
[3] *Corresponding author: flobo@unsa.edu.ar.*

Abstract. After the study of a diverse collection of *Phymaturus* from three Argentinian institutions and additional samples collected in the last two years we discovered several populations of uncertain taxonomic status. Based on 93 morphological characters of squamation, color pattern, gular and nuchal folds, precloacal pores, and morphometric data, we conclude that at least four of those are independent lineages which require formal description. Characters related to sexual dimorphism and dichromatism as well as the ontogenetic change of several others, from juvenile to adult specimens, are described. According to the most recent revision of the genus (Lobo and Quinteros, 2005a) and considering the descriptions made in the last four years, the taxonomic composition of the genus was raised to 23 species. In this study we provide the formal description of four additional new taxa, including their diagnosis and detailed comparisons with other members of their species groups. Two new species belong to the *patagonicus* group (provinces of Chubut and Rio Negro, in Patagonia between 46° and 41° of latitude) while the other two belong to the *palluma* group (Neuquén and Catamarca provinces, western Argentina, 39° and 27-26°30' of latitude respectively). With the exception of one case for which four localities are reported, all new species are restricted to their type localities. This fact confirms a common historical distributional pattern for most species of the genus.

Keywords. New species; *Phymaturus;* Taxonomy.

Introduction

Phymaturus is a genus of South American lizards which live along the arid western region of Argentina and the adjacent Andean areas of Chile, between 26° and 45°30' (between the patagonic Chubut province and Catamarca, in northern Argentina). The genus is known to be an herbivorous clade of saxicolous iguanian reptiles which has been studied extensively for the last decade, raising its taxonomic composition to 23 species (Lobo and Quinteros, 2005a, b; Lobo and Abdala, 2007; Scolaro and Ibarguengoytia, 2007; Scolaro and Ibarguengoytia, 2008; Scolaro and Tappari, 2009; Scolaro and Pincheira Donoso, 2010). *Phymaturus* is characterized by a wide, flat head and body, lateral nuchal skin folds obscured by fat-filled pouches, and a tail provided with regular whorls of spinose scales (Etheridge, 1995). Etheridge (1995) recognized 10 species in two groups, the *patagonicus* and *palluma* groups. The former contained *Phymaturus patagonicus* Koslowsky (1898), and five species originally described as subspecies of *patagonicus: Phymaturus indistinctus* Cei and Castro (1973), *Phymaturus nevadoi* Cei and Roig (1975), *Phymaturus payuniae* Cei and Castro (1973), *Phymaturus somuncurensis* Cei and Castro (1973), and *Phymaturus zapalensis* Cei and Castro (1973). The *palluma* group included *Phymaturus palluma* (Molina, 1782), *Phymaturus mallimacci* Cei (1980), *Phymaturus punae* Cei *et al.* (1983), and *Phymaturus antofagastensis* Pereyra (1985). Subsequently, Scolaro and Cei (2003) described *Phymaturus calcogaster* from the precordillera of Chubut (later emended this type locality to the eastern region of the same province). Cei and Videla (2003) described *Phymaturus verdugo,* and Pincheira-Donoso (2004) *Phymaturus vociferator,* members of the *palluma* group. In a comprehensive taxonomic revision and phylogenetic study, Lobo and Quinteros (2005a) described four new species: *Phymaturus dorsimaculatus* (*palluma* group), *Phymaturus excelsus, Phymaturus spectabilis* and *Phymaturus tenebrosus* all members of the *patagonicus* group. After that, Pincheira Donoso et al (2008) claimed that *Phymaturus dorsimaculatus* is a synonym of *Phymaturus vociferator.* Lobo and Quinteros (2005b) redescribed *Phymaturus patagonicus* and revalidated *Phymaturus spurcus* Barbour 1921 which was synonymized to *Phymaturus patagonicus* by Burt and Burt (1931). In recent times Scolaro and Ibarguengoytia (2007, 2008) described two new species of the *patagonicus* group from the northern areas of Patagonia (Rio Negro province), *Phymaturus ceii* and *Phymaturus manuelae.* Lobo and Abdala (2007) studied populations of southern and central Mendoza, inhabiting a pair of ancient

volcanic elevations located in the area called by biogeographers "Payunia" (Roig-Juñent *et al.,* 2006) describing *Phymaturus roigorum* (*palluma* group). More recently, Scolaro *et al.* (2008) described *Phymaturus agilis* living syntopically with *Phymaturus spectabilis* Lobo and Quinteros (2005a). Corbalán *et al.* (2009) found a population in Laguna Diamante (Mendoza) that was different from the other populations known in this region (*P. verdugo, P. palluma, P. roigorum*) describing *Phymaturus gynechlomus*. Scolaro and Tappari (2009) described *Phymaturus desuetus* (*patagonicus* group), and Scolaro and Pincheira Donoso (2010) described two additional species from Chubut: *Phymaturus videlai* and *Phymaturus castillensis*.

Contrary to the studies of *Liolaemus* taxonomy which had been intensively reviewed for decades and showed an exponential growth in its taxonomic composition (*see* Etheridge and Espinoza, 2000), *Phymaturus* had not been exhaustively revisited for ten years (Etheridge, 1995). After that time, as shown above, many isolated and independent populations were described. It seems that both taxonomy and phylogeny are still subjects of research and new discoveries are to be revealed. The main purpose of this contribution is to provide a formal description of four new species, adding new data for the better understanding of this genus.

Materials and Methods

We examined 332 specimens belonging to 22 species of the genus, as well as the type series of the new ones herein described (72) (*see* Appendix 1). We provide the original description of four new taxa of *Phymaturus;* with data on their variation and distributions. Measurements were taken using digital callipers of 0.02 mm of precision; pictures of live specimens were taken in the field using a digital camera, and most character details were examined under a stereomicroscope. Most of characters described in diagnoses and descriptions followed standards published in Smith (1946), Cei (1986, 1993), Laurent (1984, 1986), Etheridge (1995) and Lobo and Quinteros (2005a). All specimens collected in the last two summers were fixed using 10% formalin and deposited in 70% ethanol. All collection data are recorded in databases of the collections Fundación Miguel Lillo, Tucumán, Argentina (FML) and Museo de Ciencias Naturales, Universidad Nacional de Salta, Argentina (MCN).

Results

New species of the *Phymaturus patagonicus* group

Phymaturus felixi sp. nov.

Holotype: MCN 1280 (Fig. 1). Male. 108 km S of Paso de Indios, on provincial road 24. Departamento Paso de Indios, Chubut Province, Argentina. Abdala, C.; F. Lobo; I. Martinez Oliver; S. Quinteros col.

Paratypes: MCN 1279, 1281-83. One adult male, two juveniles (males), one adult female. Same data as holotype.

Diagnosis: Phymaturus felixi belongs to the *patagonicus* group (*sensu* Etheridge, 1995) because it has flat imbricate superciliaries, non-rugose dorsal scales on tail, subocular usually not fragmented and subocular supralabials separated by one scale row. The new species is distinguishable from all other species of the group by the following character combination: pattern of double longitudinal row of rectangular ocelli over dorsum, surrounded by thin black lines (and white lines, but less distinguishable) (Figs. 1 and 2); the color of posterior surface of thighs is brown, variegated in black and speckled with small white spots; males showing slender transversal with lines on tibia (even in juvenile) (Fig. 3); female with precloacal pores and both sexes exhibiting a bright orange color over chest, abdomen and ventral surfaces of thighs (individuals of *P. patagonicus* from El Sombrero collected the same week lack this coloration) (Fig. 2). The morphologically most similar species to *Phymaturus felixi* are *P. castillensis* and individuals (not all) of *P. patagonicus* from El Sombrero, *P. felixi* differs from both in the following characters: *Phymaturus felixi* has more scales around midbody, mean = 216,8; SD = 10,1; R = 204-228 (*P. castillensis:* mean = 184,7; SD = 13,9; R = 173-200; *P. patagonicus:* mean = 183; SD = 12.9; R = 160-213); *Phymaturus felixi* exhibits (all specimens) a pattern of ocelli marked by black lines, variegated posterior surfaces of thighs with three colors: black, white and brown, while in *P. castillensis* and *P. patagonicus* ocelli are vague and poorly marked, and in the case of *P. patagonicus* they are absent in most specimens, posterior surfaces of thighs are white or light gray with small and scarce white spots (not brown, no variegation). *Phymaturus felixi* differs from *P. calcogaster* and *P. somuncurensis* because their common dorsal pattern consists of a brown to black dorsal background speckled with

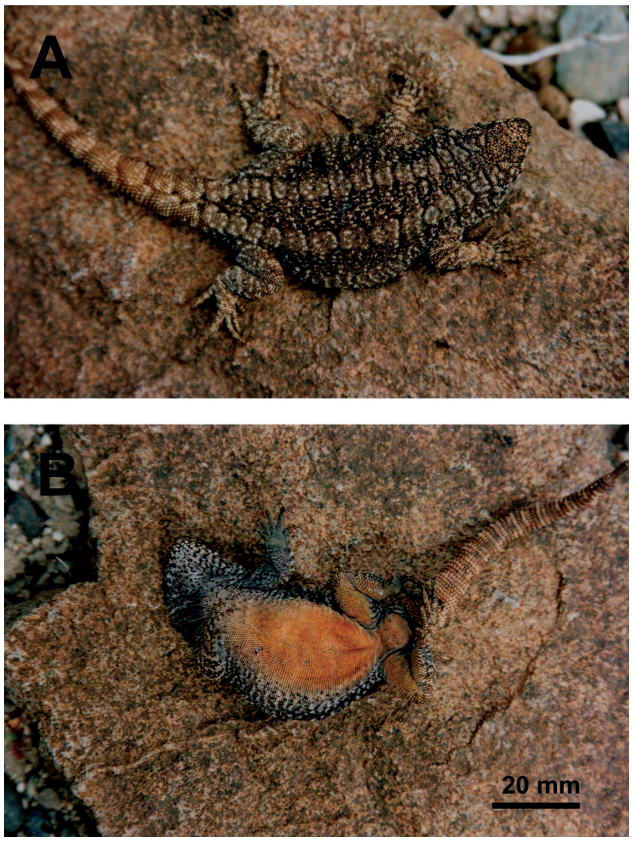

FIGURE 1. A) and B) Dorsal and ventral views of the holotype of *Phymaturus felixi* n. sp. MCN 1280.

FIGURE 2. A) Dorsal view of two males and one female of *Phymaturus felixi* n. sp. (MCN 1283, MCN 1281 and MCN 1282); B) ventral view of the same specimens.

white spots, both species lack the dorsal pattern forming ocelli and their throats are strongly variegated. *P. indistinctus* and *P. videlai* have a common pattern formed by a brown dorsal background speckled with small markings in black; *P. nevadoi* and *P. payuniae* exhibit a white spotted pattern without dorsal ocelli, with the exception of females belonging to the second species (but those are not marked with black lines). *Phymaturus felixi* differs from *P. excelsus* and *P. spectabilis* because both species have their dorsal pattern formed by a double longitudinal row of ocelli drawn on a homogeneous black or dark brown background. *P. manuelae* shows its occellated pattern (particularly well-developed in females) margined with black thick lines, and in males the black color is widespread, background black color in *P. felixi* is restricted to males. In *P. felixi* there are small white spots scattered all over dorsum of trunk and tail.

Description of holotype (Fig. 1): Male. SVL 83.1 mm. Head length 14.8 mm. Head width 14.9 mm. Head height (at parietal) 7.4 mm. Axilla-groin 39.4 mm (47.5% of Snout-vent length). Tail length (complete, not regenerated) 85.8 mm (1.03 times SVL). Body moderately wide, trunk width: 33.8 mm (40.7% of SVL). Twenty three smooth dorsal head scales. Four scale organs in each postrostral. Nasal bordered by eight scales, not in contact with rostral. Canthal separated from nasal by three scales. Loreal region flat. Nine enlarged supralabial scales with the eighth upturned at its posterior end but not contacting subocular. Seven enlarged infralabials. Auditory meatus oval with four to six flat projecting scales on the anterior margin. Auricular scale absent. Ten convex, juxtaposed temporals. Rostral undivided. Mental subpentagonal, in contact with six scales. Interparietal bordered by eight scales. Frontal region without an azygous scale. Supraorbital semicircles inconspicuous. No distinctly enlarged supraoculars. Eight imbricate flat superciliaries. Subocular fragmented, separated from supralabials by one to two rows of lorilabials. Ten lorilabials, the eighth contacting subocular. Preocular separated from lorilabial row by three scales. Scales of throat round, flat, and juxtaposed. Ninety-two gulars between auditory meata. Lateral nuchal folds well developed, with granular scales over longitudinal fold. Antehumeral pocket well developed. Seventy-eight scales between

auditory meatus and shoulder. From ventral view, gular fold absent and posterior gular folds present with their anterior margins without enlarged scales on their borders. Dorsal scales round, smooth, juxtaposed; 47 dorsal scales along midline of the trunk in a length equivalent to head length. Scales around midbody: 226. Mid-dorsal scales not enlarged in comparison to those on flanks. Ventral scales larger than dorsals. Ventral scales between mental and precloacal pores: 175. Eight precloacal pores. Brachial and antebrachial scales smooth with rounded posterior margins. Supracarpals laminar, round, smooth. Subdigital lamellae of fingers with three keels. Number of subdigital lamellae of fingers I: 12; II: 16; III: 20; IV: 20; V: 15. Claws moderately long. Supradigital lamellae convex, imbricate. Infracarpals and infratarsals of rhomboid shape with a conspicuous mucron. Supracarpals and supratarsals smooth, with round posterior margins. Subdigital lamellae of toes I: 13; II: 16; III: 20; IV: 23; V: 16.

Color of holotype in *life* (Figs. 1 and 2): Brown speckled dorsal background with small black markings, also dispersed over dorsal half of flanks. Ventral half of flanks with light brown and irregularly distributed white scales, hardly any black scales. Dorsum with a diffuse pair of longitudinal light brown rows of ocelli. Ocelli separated from one another by slender transversal black and white lines. Fore and hindlimbs light brown without black markings or reticulations, only dispersed white scales scattered over surface of arms, antebrachium, thighs. Posterior surface of tibia with very slender transversal white lines. Throat, chest and ventral surfaces of forelimbs light gray, with black markings scattered on throat, under lower jaws, a thin reticulation. Abdomen, ventral surfaces of cloacal area and thighs light orange. A series of precloacal pores with an evident yellow/orange color. Dorsum of tail brown ringed and with dispersed white scales, lighter background color in contrast to body color. Ventral region of tail uniform brown (no pattern).

Variation: Based on three adult specimens and two juveniles. SVL 78.2-85.2 mm (x = 82.1; SD = 3.6) for adult specimens only. Head length 17-19% (x = 18.3%; SD = 0.85) of SVL. Tail length 1.03-1.04

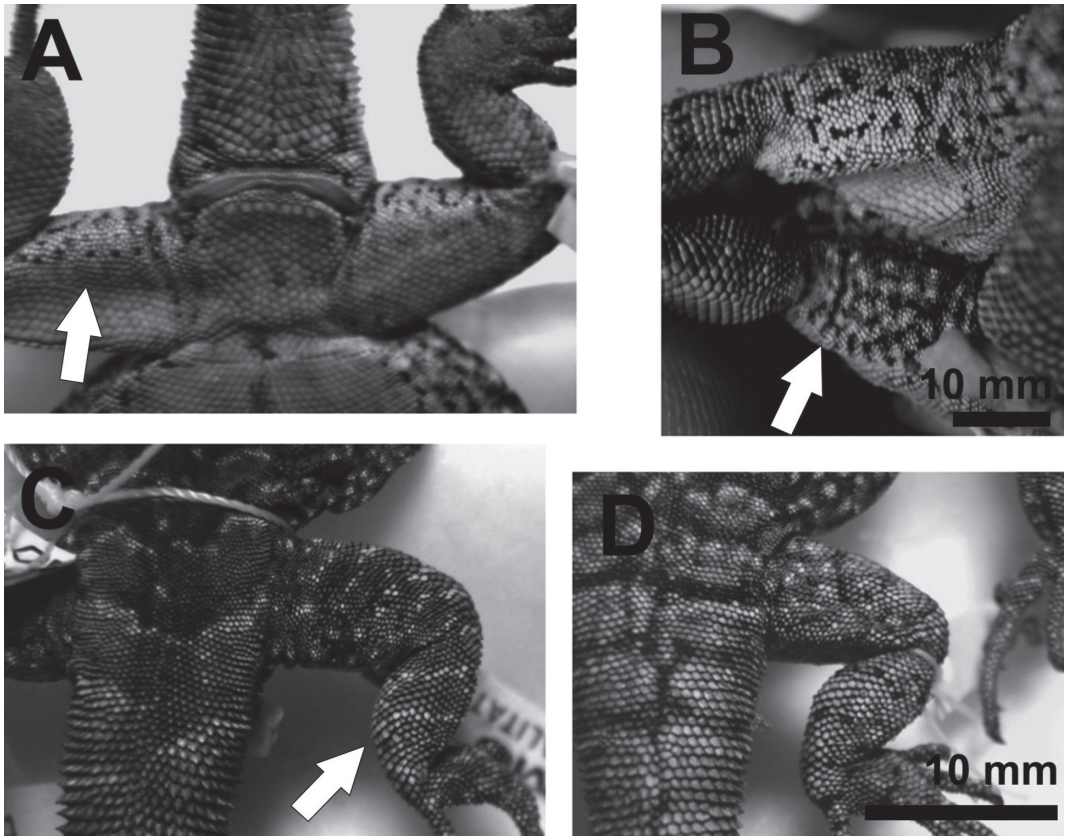

Figure 3. A) Posterior surface of thighs in *Phymaturus patagonicus* (MCN 1250); B) *Phymaturus patagonicus* (MCN 1258 above), and *Phymaturus felixi* n. sp. (MCN 1280 below); C) dorsal pattern of tibias in males of *Phymaturus felixi* n. sp. (MCN 1280); D) same view in *Phymaturus patagonicus* (MCN 1258). A and B; C and D at the same scale. For more explanations see text.

(x = 1.04; SD = 0.44) times SVL. Scales around mid-body 204-228 (x = 216.8; SD = 10.1). Dorsal head scales 18-23 (x = 21; SD = 1.9). Ventrals 159-189 (x = 171.8; SD = 11.3). Scales surrounding interparietal 6-8 (x = 6.8; SD = 0.84). Scales of neck along longitudinal fold from posterior border of auditory meatus to shoulder 78-90 (x = 82.2; SD = 4.9). Gulars 80-92 (x = 87.6; SD = 5.0). Scales between rostral and frontal 8-10 (x = 9.4; SD = 0.9). In two specimens dorsal ocelli are very clear because black color is widespread, in males thin white transversal lines form the ringed pattern of tails and the "star" nuchal pattern is more conspicuous in males. Ventral region (chest and abdomen) light brown spotted in males, immaculate in females. Both sexes exhibit strong orange color (Fig. 2).

Etymology: We named this species after our colleague Felix Cruz, in recognition of his contribution to the knowledge of Liolaemid ecology and particularly because of his friendship.

Distribution (Fig. 4): This new species is known to be found only in the type locality, 108 km S of Paso de Indios, Chubut province (on the provincial road 24).

Phymaturus etheridgei sp. nov.

Holotype: FML 23495 (Fig. 5). Between Ingeniero Jacobacci and Molihue (provincial road 76), 41°34'47.2"S, 69°23'33.0"W. 818 m. 05/02/2009. C. Abdala, M. Bonino, F. Cruz and L. Moreno col.

Paratypes: FML 23496-501. Three males and three females. Same data as holotype. MCN 3109-3113. Two males, two females and one juvenile. 43 km N of Moligüe, Rio Negro Province, Argentina, 41°35'880"S, 69°22'628"W. F. Cruz col. 03/15/1999. FML 8435. One male. 43 km N of Moligüe. 25 de Mayo Dpt., Rio Negro. 41°35'S; 69°22'W. F. Cruz col. 03/15/1999.

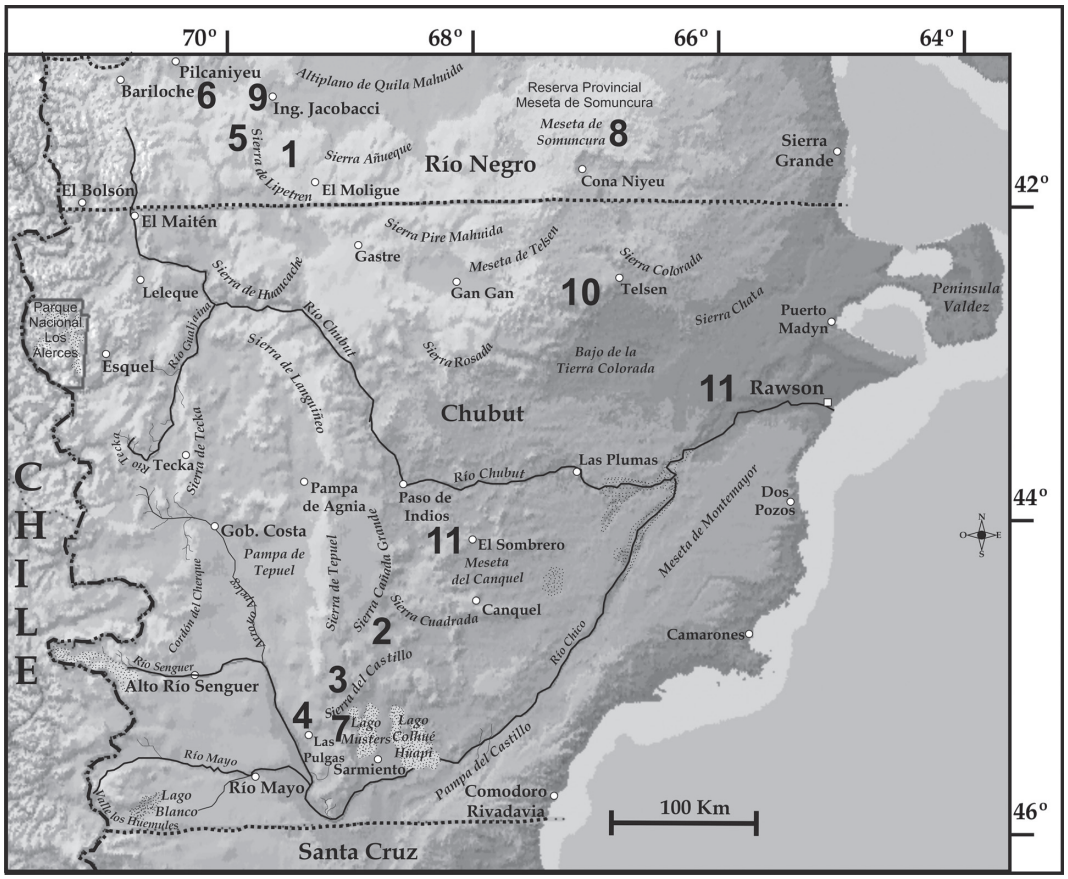

FIGURE 4. Map of Chubut and southern Rio Negro provinces (Argentina) showing distribution of new species of the *Phymaturus patagonicus* group described in this contribution plus other species of the genus. *Phymaturus etheridgei* n. sp. (1), *Phymaturus felixi* n. sp. (2), *Phymaturus castillensis* (3), *Phymaturus videlai* (4), *Phymaturus excelsus* (5), *Phymaturus spurcus* (6), *Phymaturus indistinctus* (7), *Phymaturus somuncurensis* (8), *Phymaturus spectabilis* (9), *Phymaturus calcogaster* (10), *Phymaturus patagonicus* (11).

Diagnosis: Phymaturus etheridgei n. sp. belongs to the *patagonicus* group because it has flat imbricate superciliaries, non-rugose dorsal scales on tail, usually not fragmented subocular and subocular supralabials separated by one scale row, chin shields differentiated in size from sublabial and gular scales. *Phymaturus etheridgei* has a uniform black or dark brown dorsal pattern with small white spots irregularly distributed lacking the typical rows of paravertebral ocelli of *P. excelsus, P. spectabilis,* females of *P. manuelae, P. payuniae. Phymaturus etheridgei* also does not show the degree of polymorphism of many species that show brown morphs (*P. excelsus, P. spectabilis, P. tenebrosus*) or the all-population fixed brown pattern of *P. spurcus. P. indistinctus* and *P. videlai* because they show a brown or gray dorsal background with small black scattered spots , *P. videlai* and *P. castillensis* exhibit a white dorsal nuchal color, and also the "star" pattern over the occipital and nuchal area (Fig. 8C). *P. castillensis* show pre and postcapular black spots. *P. felixi* shows transversal thin black stripes, emarginated by white. Males of *P. felixi* show transversal white stripes over fore and hindlimbs, both characters absent in *P. etheridgei. Phymaturus etheridgei* can be differentiated from other members of the group (*P. felixi, P. somuncurensis, P. manuelae* and *P. castillensis*) by having a concave or depressed internasal area that can be extended to the postrostral area. It differs from all species of the group (with the exception of *P. excelsus, P. spectabilis* and *P. indistinctus*), in its dorsal color pattern of body that changes abruptly on the tail, from dark brown or black to light brown (Fig. 5). *Phymaturus etheridgei* differs from *P. calcogaster* in not having thick variegated pattern of throat. It differs from *P. calcogaster* and *P. patagonicus* because they show large white spots over their dorsum. *Phymaturus etheridgei* shows margins of chinshields surrounded by dark pigmentation, absent in *P. payuniae, P. calcogaster, P. tenebrosus, P. ceii, P. excelsus* and *P. spurcus.*

Phymaturus etheridgei shows subdigital lamellae pigmented over its entire surface not restricted between central keels like *P. tenebrosus, P. ceii, P. patagonicus, P. indistinctus, P. videlai* and *P. castillensis* (Fig. 8D).

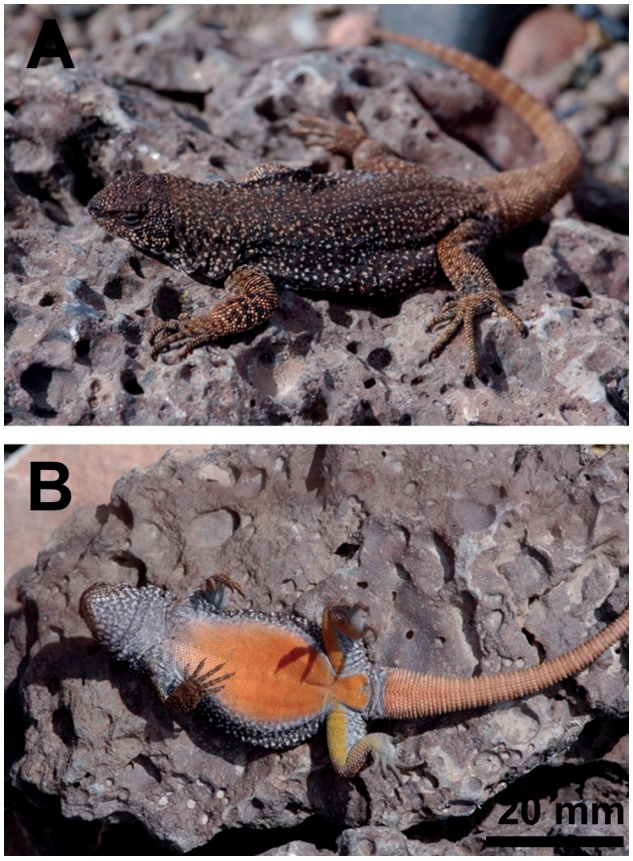

FIGURE 5. A) and B) Dorsal and ventral views of the holotype of *Phymaturus etheridgei* n. sp. (FML 23495).

FIGURE 6. A) and B) Dorsal and ventral views of a female of *Phymaturus etheridgei* n. sp. (FML 23495).

Description of holotype (Fig. 5): Male. SVL 90.0 mm. Head length 16.4 mm. Head width 14.8 mm. Head height (at parietal) 8.6 mm. Axilla-groin 39.3 mm (43.7% of Snout-vent Length). Tail length 99.5 mm. Body moderately wide, trunk width: 29.5 mm (32.7% of SVL). Twenty one smooth dorsal head scales. Four, five, and six scale organs in each postrostral. Nasal bordered by nine scales, not in contact with rostral. Canthal separated from nasal by two scales. Loreal region flat. Eleven enlarged supralabial scales. Eight enlarged infralabials. Auditory meatus oval with six conical projecting scales on the anterior margin. Auricular scale absent. Nine convex, juxtaposed temporals. Rostral undivided. Mental subpentagonal, in contact with six scales. Interparietal in contact with seven scales. Frontal region without an azygous scale. Semicircles conspicuous. Eight enlarged supraoculars. Eight imbricate flat superciliaries. Subocular split up into two scales and separated from supralabials by two rows of lorilabials. Ten lorilabials. Scales of throat round, flat, and subjuxtaposed. Seventy-two gulars between auditory meata. Lateral nuchal folds well developed, with granular scales over longitudinal fold. Antehumeral pocket well developed. Seventy scales between auditory meatus and shoulder. In ventral view, gular fold well developed and posterior gular fold conspicuous with one or two enlarged scales in their anterior margins. Dorsal scales round, smooth, juxtaposed. Thirty-nine dorsal scales along midline of the trunk in a length equivalent to head length. Scales around midbody: 228. Middorsal scales not enlarged in comparison to those on flanks. Ventral scales larger than dorsals. Ventral scales between mental and precloacal pores: 185. Seven precloacal pores. Smooth brachial and antebrachial scales with rounded posterior margins. Flat, round, smooth supracarpals. Subdigital lamellae of fingers with three keels. Number of subdigital lamellae of fingers I: 10; II: 17; III: 20; IV: 24; V: 15. Claws moderately long. Supradigital lamellae convex, imbricate. Infracarpals and infratarsals with round margins and 1-2 or 3 obtuse mucrons. Supracarpals and supratarsals smooth, with round posterior margins. Subdigital lamellae of toes I: 12; II: 17; III: 21; IV: 26; V: 18.

Color of holotype in *life* (Fig. 5): brown dorsum of head with few black scales. Light brown infralabial, supralabial and loreolabial scales, with white posterior scales to the oral commeasure. Brown reddish dorsum of body, lighter than that of flanks, with small black and white scales irregularly dispersed all over its surface. With thin, almost inconspicuous, transversal black lines. White flank spots larger than dorsal ones. Fore and hindlimbs, tail lighter brown than head and body. Light gray throat with few small dark spots. Belly and ventral surfaces of thighs, cloaca and tail bright orange.

Variation: Based on eleven adult specimens (males and females). SVL 81.5-91.4 mm (mean = 86.0; SD = 3.3). Head length 16.7-20.2% (mean = 18.6%; SD = 8.6) of SVL. Tail length 0.9-1.2 (mean = 1.08; SD = 0.08) times SVL (only five non-regenerated tails). Scales around midbody 207-241 (mean = 229.1; SD = 10.6). Dorsal head scales 19-26 (mean = 22.2; SD = 1.8). Ventral scales 168-205 (mean = 187.7; SD = 12.0). Scales in contact with interparietal 5-8 (mean = 6.8; SD = 0.7). Neck scales along longitudinal fold from posterior border of auditory meatus to shoulder 70-93 (mean = 80.3; SD = 7.2). Gular scales 66-76 (mean = 71.5; SD = 3.4). Scales between rostral and frontal 8-12 (mean = 9.5; SD = 1.0). Immaculate gray throat in several individuals with small black markings in others. Ventral region including chest, belly, cloaca and limbs light gray with tan orange color which in a few individuals becomes much brighter. Dorsal surface of tail varying between light brown to light red (Figs. 5 and 6).

Etymology: We name this species after Richard Etheridge in recognition of his contribution to Liolaemid systematics, and particularly in acknowledgement for many years of generous advice and collaboration with his Argentinean colleagues.

Distribution (Fig. 4): Only known for the type locality, 43 km N of Moligüe (Rio Negro province) (on provincial road 76) (41°34’47.2”S, 69°23’33.0”W. 818 m).

Key to species of the *Phymaturus patagonicus* group

Flat imbricate superciliaries; chinshields conspicuously enlarged compared to other gular scales (Fig. 7A); scales of tail smooth; tail moderately spinose.

Payunia (Southern Mendoza and Neuquen):

1. Dorsum of males black or dark gray with white spots irregularly spread out; females with paravertebral rows of ocelli or with longitudinal black flank band; ventral scales of regular size: mean = 180.11; SD = 14.3; or mean = 173.5, SD = 19.3 2
   Males and females with the same pattern of dark gray to black with white spotting; ventral scales

larger (mean = 160, SD = 8.7) (El Nevado, Mendoza Province) .....*Phymaturus nevadoi*

2. Females with paravertebral large lighter ocelli; lorilabial row usually in contact with subocular scale; variegate pattern in tails (Payún Volcano, Mendoza Province).....*Phymaturus payuniae*

   Females and juveniles with continuous black band along flanks; lorilabial row not in contact with subocular scale; vanishing ringed pattern in tails (region of Zapala, Neuquén Province)..... .....*Phymaturus zapalensis*

Western Rio Negro species:

1. Common pattern of black or dark brown dorsal color with fine white spots scattered irregularly, some specimens without spotting pattern; interparietal scale not highlighted from general color of head...2

   Two basic patterns: ocellate pattern with black color of background (without pattern of small white spots like above) or light to dark brown color of background; interparietal scale white...3

2. Dark brown to light brown dorsum with small white spots in males; dark brown females with paravertebral ocelli light brown (Chasicó, Rio Negro Province)..... *Phymaturus ceii*

   Black dorsum with small and scarce spots in white; some specimens completely black; others completely brown, spotted irregularly in black on flanks and/or paravertebral region (Cerro Alto, Rio Negro Province, Argentina) ....*Phymaturus tenebrosus*

3. Homogeneous brown color all over dorsum, a few specimens with slightly conspicuous paravertebral ocelli; orange to mustard chest and abdomen; no individuals exhibiting ocellate pattern

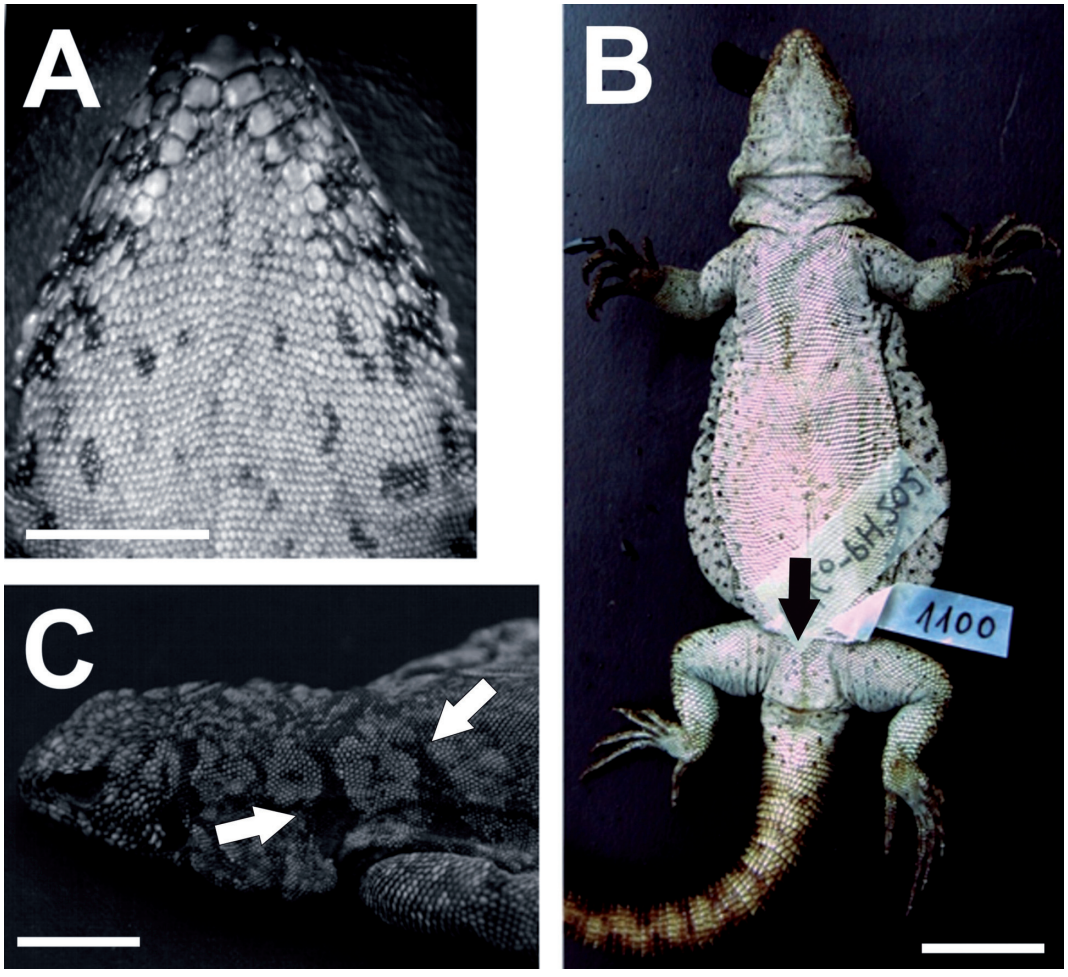

FIGURE 7. Informative characters varying in the *Phymaturus patagonicus* group used in the key of identification. A) Throat view of *Phymaturus castillensis* IBA 869-1 (chinshields differentiated in size from gular scales); B) Ventral view of a female of *Phymaturus manuelae* UNCO-PH 202 (ventral surfaces of thighs and cloaca with fine black scattered spots); C) Lateral view of *Phymaturus castillensis* IBA 869-1 (pre and postcapular black spots). Line = 10 mm.

(Estancia Huanuluan, Rio Negro Province, Argentina) ..... *Phymaturus spurcus*

Black background color of dorsum with a couple of paravertebral rows of brown or light gray ocelli; ventral surfaces of thighs and cloaca with small black scattered spots (Fig. 7B); 2/4 are polymorphic species with brown individuals ...4

4. Dorsal background color not uniform, disturbed by longitudinal brown or black short segments; three basic colors of dorsum: black, dark and light brown; preocular in contact with canthal scale (26 km W of Comallo, Rio Negro Province, Argentina)..... *Phymaturus manuelae*

   Dorsal background color uniform; two basic dorsal colors: black and brown or black and gray; Preocular not in contact with canthal scale.....5

5. Dorsal pattern formed by paravertebral rows of ocelli 6

   Dorsal pattern without paravertebral rows of ocelli 7

6. Dorsal ocelli slightly elongated in the direction of the antero-posterior axis of body, light gray; light gray ventral half of flanks with dense black reticulation (Ojo de Agua, Rio Negro Province, Argentina) ..... *Phymaturus excelsus*

   Dorsal ocelli slightly transversal to the antero-posterior axis of body, brown; brown to light cream ventral half of flanks with scarce black reticulation (28 km S of Ingeniero Jacobacci, Rio Negro Province, Argentina) .... *Phymaturus spectabilis*

7. Homogeneous light brown with almost inconspicuous lighter ocelli (in the same pattern of ocellate morphs described above); no paravertebral darker brown reticulation .... *Phymaturus excelsus*

   Dark brown middle dorsal area of trunk with paravertebral areas with dark brown thin reticulation over light brown background (no ocellate pattern distinguishable)..... ..... *Phymaturus spectabilis*

Northern Chubut and Somuncurá Plateau species:

All species with pattern of white spots irregularly distributed all over dorsum of body. Black dark gray background dorsal color of trunk and, in variable degrees, exhibiting a light brown-red color ("clay" color).

1. Relative small white spots over bodies; throats with small and scarce spots or none 2

   Large white spots over bodies (Fig. 8A); throats with small spots to thick reticulation 3

2. Flat or convex internasal region; tail with the same color of trunk; (Laguna Raimundo, Meseta de Somuncurá, Rio Negro Province) .... *Phymaturus somuncurensis*

   Internasal region concave in the middle; tail color different from trunk, lighter, brown vs black or light brown vs dark brown (between Jacobacci and Molihue; Rio Negro Province)..... ..... *Phymaturus etheridgei* n. sp.

3. Larger scales of dorsum (fewer scales around midbody, mean = 183, SD = 13); throat with small spots (Dolavon and populations of and between El Sombrero, Chubut Province) .... *Phymaturus patagonicus*

   Smaller scales of dorsum (more scales around midbody, mean = 228, SD = 12.4); throat with black variegation (Laguna de la Vaca, Chubut Province)..... *Phymaturus calcogaster*

Austral species of the *Phymaturus patagonicus* group (Chubut):

1. Dorsal pattern of paravertebral ocelli bordered by thin black and white lines; small white spots scattered all over dorsum of trunk; dorsum of neck with same color of head (108 km S of Paso de Indios, Chubut Province, Argentina) .... *Phymaturus felixi* n. sp.

   Dorsal pattern formed by slightly differentiated paravertebral rows (can be lost); white spots absent; dorsum of neck white, (Fig. 8C) 2

2. Conspicuous pre and postcapular black bars (Fig. 7C); diffuse dorsal pattern of ocelli; infradigital pigmentation not concentrated between central keels (Sierra Castillo, Chubut Province, Argentina) ..... *Phymaturus castillensis*

   No pre and postcapular black bars; no ocelli dorsal pattern; homogeneous pattern of light gray or light brown with small black spots irregularly distributed; dark pigmentation of infradigital lamellae concentrated between central keels.....3

3. Light brown background color of dorsum; vertebral black stripe; "star" pattern on dorsum of neck present (Sarmiento-Buen Pasto, Chubut Province, Argentina) ..... *Phymaturus videlai*

   Light gray background color of dorsum, with fine transversal black stripes; "star" pattern on dorsum of neck absent; (Las Pulgas, Chubut Province, Argentina)..... *Phymaturus indistinctus*

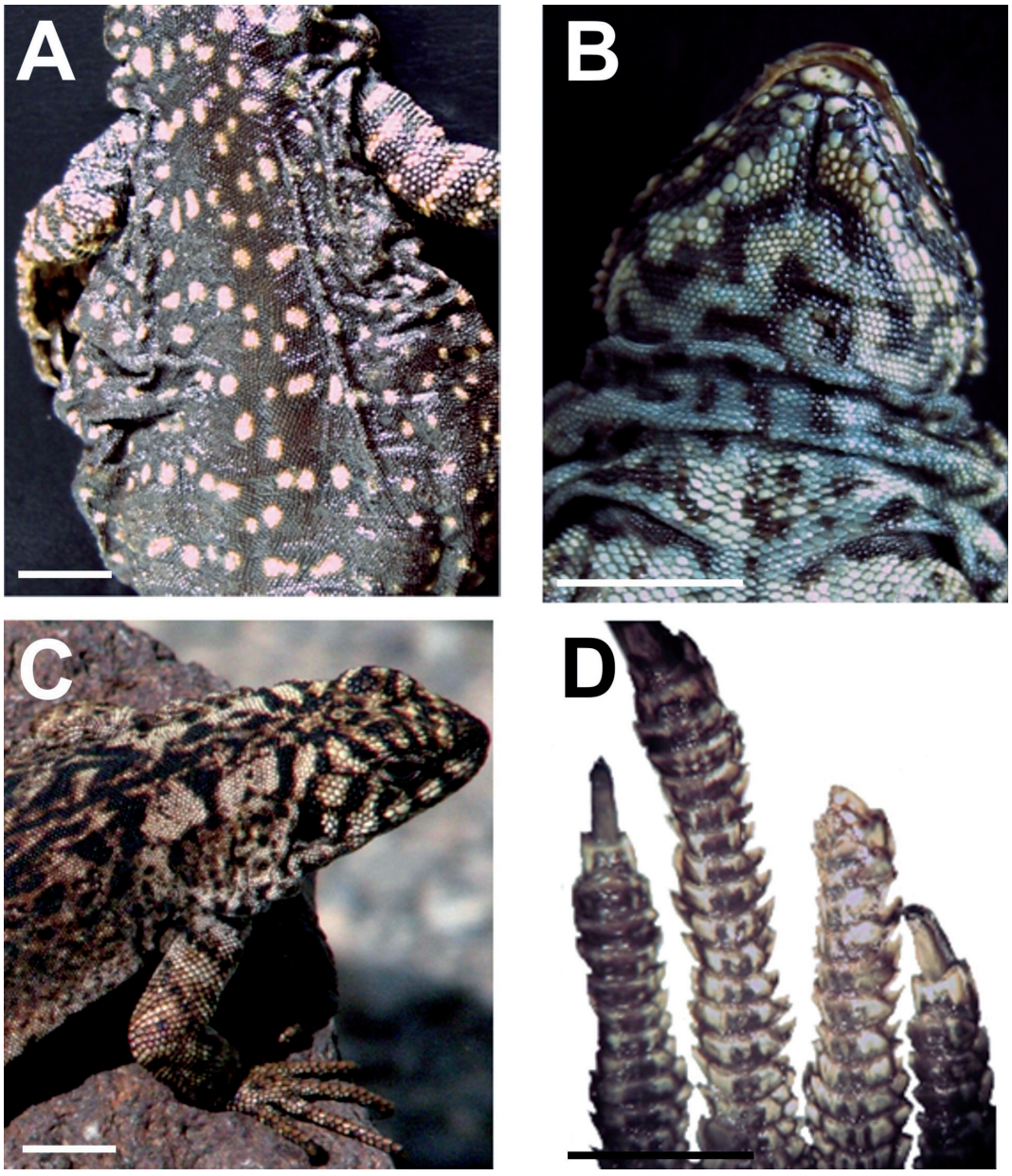

Figure 8. Characters exhibiting variation in the *Phymaturus patagonicus* group which are used in the key of identification. A) Dorsal view of trunk of *Phymaturus calcogaster* UNCO-PH 399 (with large white spots over their bodies); B) Throat of *Phymaturus calcogaster* UNCO-PH 399 (throat with black variegation); C) *Phymaturus videlai* FML 21242 (dorsum of neck white and "star" pattern on dorsum of neck); D) Subdigital lamellae of *Phymaturus indistinctus* MCN 1274 (dark pigmentation of infradigital lamellae restricted between central keels). Line = 10 mm.

New species of the *Phymaturus palluma* group

Phymaturus laurenti sp. nov.

Holotype: MCN 2855 (Fig. 9). Male. Around 10 km S of El Peñón, Departamento Antofagasta de la Sierra, Catamarca province, Argentina. 26°39'40.6"S; 67°13'26.3"W; 3815 m, rocky outcrops 300 m east of provincial road 43. F. Lobo and S. Valdecantos col.

Paratypes: MCN 2838-2854, 2856-2862. Seven males, thirteen females and four juveniles. Same data as holotype.

Diagnosis: Phymaturus laurenti belongs to the *palluma* group (*sensu* Etheridge, 1995; Lobo and Quinteros, 2005a) because it has short non imbricate superciliaries, rugose dorsal scales on tail, usually fragmented subocular and undifferentiated

chinshields. *Phymaturus laurenti* belongs to the puna subclade of the *palluma* group (Lobo and Quinteros 2005a) because it has its typical "spray" dorsal pattern. The new species is distinguishable from *P. antofagastensis* (most phenetically similar species) because it has a typical pattern of small spots spread over the whole dorsum as a homogeneous "spray" (a common condition found in most species of the puna clade within the *palluma* group) while in *P. antofagastensis* the spots are irregularly aggregated (Lobo and Quinteros, 2005a, Fig. 12). In addition to this diagnosis, *P. antofagastensis* has the five-white-spot pattern over the dorsal part of the head which is exclusive to the species. Moreover, in *P. antofagastensis* most females and many males exhibit transversal stripes which are absent in the new species (Figs. 9 and 10). Males of *Phymaturus laurenti* exhibit enlarged scales in the base of the tail, a condition not shared by *P. antofagastensis*. Plantar scales of *P. laurenti* are smooth while in *P. antofagastensis* they are strongly striated and keeled. *Phymaturus laurenti* differs from *P. mallimaccii* in having enlarged scales in the center of chest and males also having enlarged postcloacal scales, in *P. mallimaccii* a vertebral light gray ribbon can be present (never in *P. laurenti*) and it is distinguishable from *P. punae* because the backs of the males of this last species are completely yellow (without brown scales dispersed within that color like in other species of the group) and in *P. laurenti* the melanic dorsum of the neck is interrupted at its midline while in *P. punae* it is completely uniform.

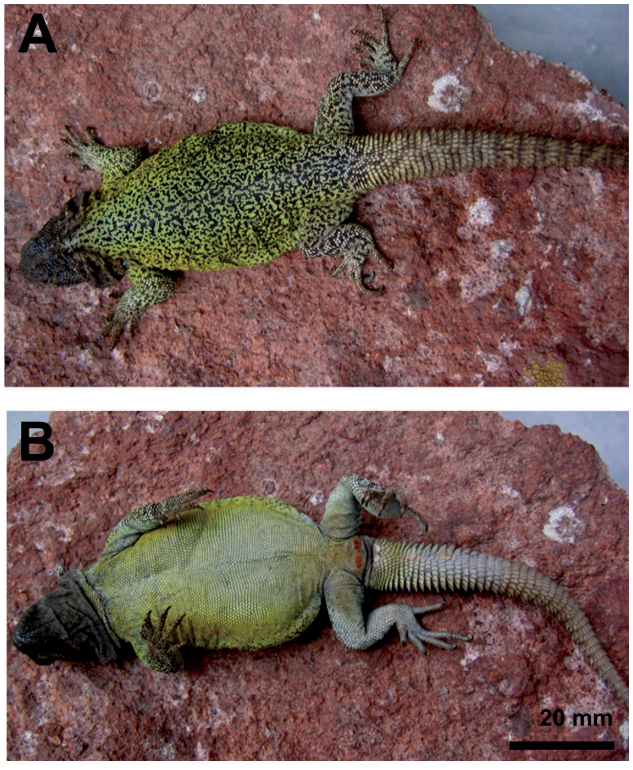

Figure 9. A) and B) Dorsal and ventral views of the holotype of *Phymaturus laurenti* n. sp. (MCN 2855).

Description of holotype (Fig. 9): Male. SVL 97.5 mm. Head length 17.7 mm. Head width 16.8 mm. Head height (at parietal) 10.4 mm. Axilla-groin 50.3 mm (51.6% of Snout-vent length). Tail length (complete, not regenerated) 92.6 mm (0.95 times SVL). Body moderately wide, trunk width: 39.3 mm (40.3% of SVL). Twenty five slightly rugose dorsal head scales. Two, one, one, and two scale organs in each postrostral. Nasal bordered by ten scales, not in contact with rostral. Canthal separated from nasal by two scales. Flat loreal region. Thirteen enlarged supralabial scales with the eleventh upturned at its posterior end but not contacting subocular. Ten enlarged infralabials. Oval auditory meatus with four conical projecting scales on the anterior margin. Auricular scale absent. Eleven conical/spiny, juxtaposed temporals. Rostral undivided. Mental wider than longer, in contact with six scales. Interparietal bordered by nine scales. Frontal region without an azygous scale. Inconspicuous supraorbital semicircles. No distinctly enlarged supraoculars. Ten non imbricate quadrangular superciliaries.

Fragmented subocular separated from supralabials by one to two rows of lorilabials. Twelve lorilabials, none contacting subocular. Preocular separated from lorilabial row by three scales. Scales of throat round, almost granular, and juxtaposed. Eighty gular scales between auditory meata. Inflated lateral nuchal folds, with granular scales. Longitudinal, rictal and postauricular folds not differentiated. Inconspicuous antehumeral pocket. Sixty-eight scales between auditory meatus and shoulder. In ventral view, gular fold not developed and posterior gular folds present with four enlarged scales on the borders of their anterior margins. Five enlarged scales on the center of chest. Small, round and juxtaposed dorsal scales. Thirty three dorsal scales along midline of the trunk in a length equivalent to head length. Scales around midbody: 182. Mid-dorsal scales not enlarged in comparison to those on flanks. Ventral scales larger than dorsals. Ventral scales between mental and precloacal pores: 175. Five precloacal pores. Two supernumerary precloacal pores. Pore row divided. Subdigital lamellae of fingers with three keels. Number of subdigital lamellae of fingers I: 10; II: 14; III: 17; IV: 20;

V: 12. Claws moderately long. Subdigital lamellae of toes I: 10; II: 18; III: 20; IV: 24; V: 17.

Color of holotype in *life* (Fig. 9): yellow dorsal background of body with scattered small dark brown spots , more concentrated in the vertebral and paravertebral region. Yellow color projected over dorsum of limbs. Light brown tail background color exhibiting an inconspicuous ringed pattern. Brown spots are more densely distributed over dorsum of hind limbs than forelimbs. Dark brown, not completely melanic, dorsum of head and neck, with ligther dorsal midline of neck. Yellow color present in chest, belly, flanks, ventral surface of thighs and the proximal region of tail brighter over flanks. Throat homogeneously melanic. Tail light gray without pattern in most of its length (Fig. 9B).

Variation: Based on 14 adult males and 8 females. SVL 72.6-101.9 mm (mean = 91.4; SD = 7.9). Head length 17-20% (mean = 19%; SD = 1.0) of SVL. Tail length 0.71-1.04 (mean = 0.90; SD = 0.09) times SVL. Scales around midbody 167-217 (mean = 193.5; SD = 13.3). Dorsal head scales 20-27 (mean = 23.3; SD = 2.1). Ventrals 166-198 (mean = 182.7; SD = 9.6). Scales in contact with interparietal 6-11 (mean = 8.8; SD = 1.2). Scales of neck along longitudinal fold from posterior border of auditory meatus to shoulder 58-80 (x = 67.5; SD = 6.7). Gulars 75-97 (mean = 86.7; SD = 6.7). Scales between rostral and frontal 8-13 (mean = 10.4; SD = 1.4). Most females are gray (a few light brown), with ringed tails and flanks exhibiting orange color. In a couple of females the orange color projects towards the chest.

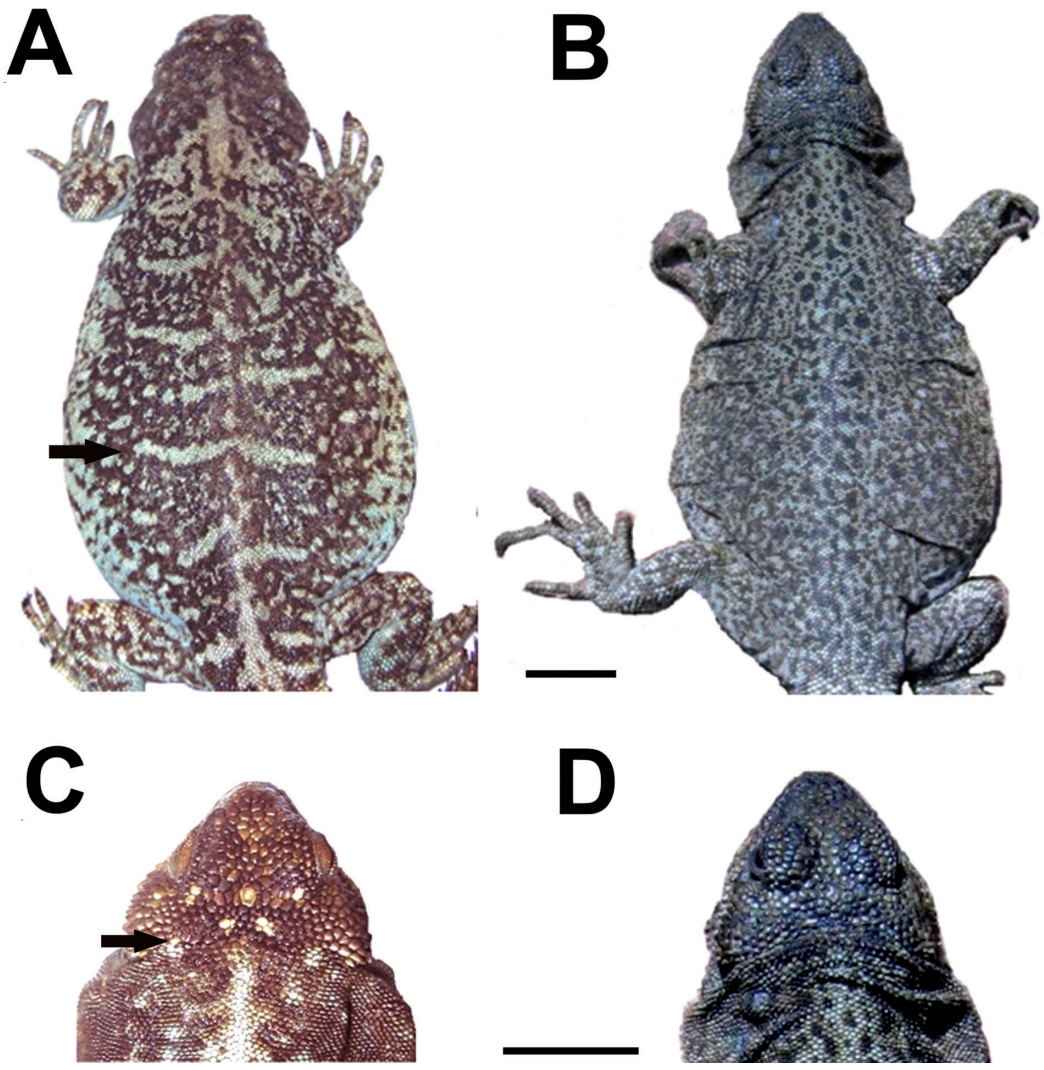

Figure 10. A) and B) Dorsal pattern of a female of *Phymaturus antofagastensis* FML 2019 (arrow indicates the transversal stripe pattern), and *Phymaturus laurenti* n. sp. MCN 2856. C) and D) dorsum of head in *Phymaturus antofagastensis* FML 2019 (arrow indicates the "dice" pattern) and *Phymaturus laurenti* n. sp. (MCN 2856). Line = 10 mm.

Chest and belly with small almost inconspicuous dark spots.

Etymology: We name this species after Raymond Laurent in recognition of his fruitful scientific contribution to Argentinean herpetology, and especially for injecting his enthusiasm and passion into his students to study amphibians and reptiles.

Distribution (Fig. 11): This new species is known to be found in the eastern borders of the puna region between 25°40' and 27° of South latitude, in five localities: Cuesta de Randolfo, Sierra de Calalaste, north of Antofagasta de la Sierra (on provincial road 43), 15 km E of El Peñón and 10 km S of El Peñón, in Catamarca province, Argentina.

Phymaturus querque sp. nov.

Holotype: FML 21556 (Fig. 12). Laguna Blanca, Laguna Blanca National Park, Zapala department, Neuquén province, Argentina. C. Abdala, S. Quinteros, G. Scrocchi, J. C. Stazzonelli col. 11/18/2007.

Paratypes: FML 21211. One female. Same data as holotype. IBA 793. Two males and two females. Laguna Blanca. Neuquén province, Argentina. J. M.

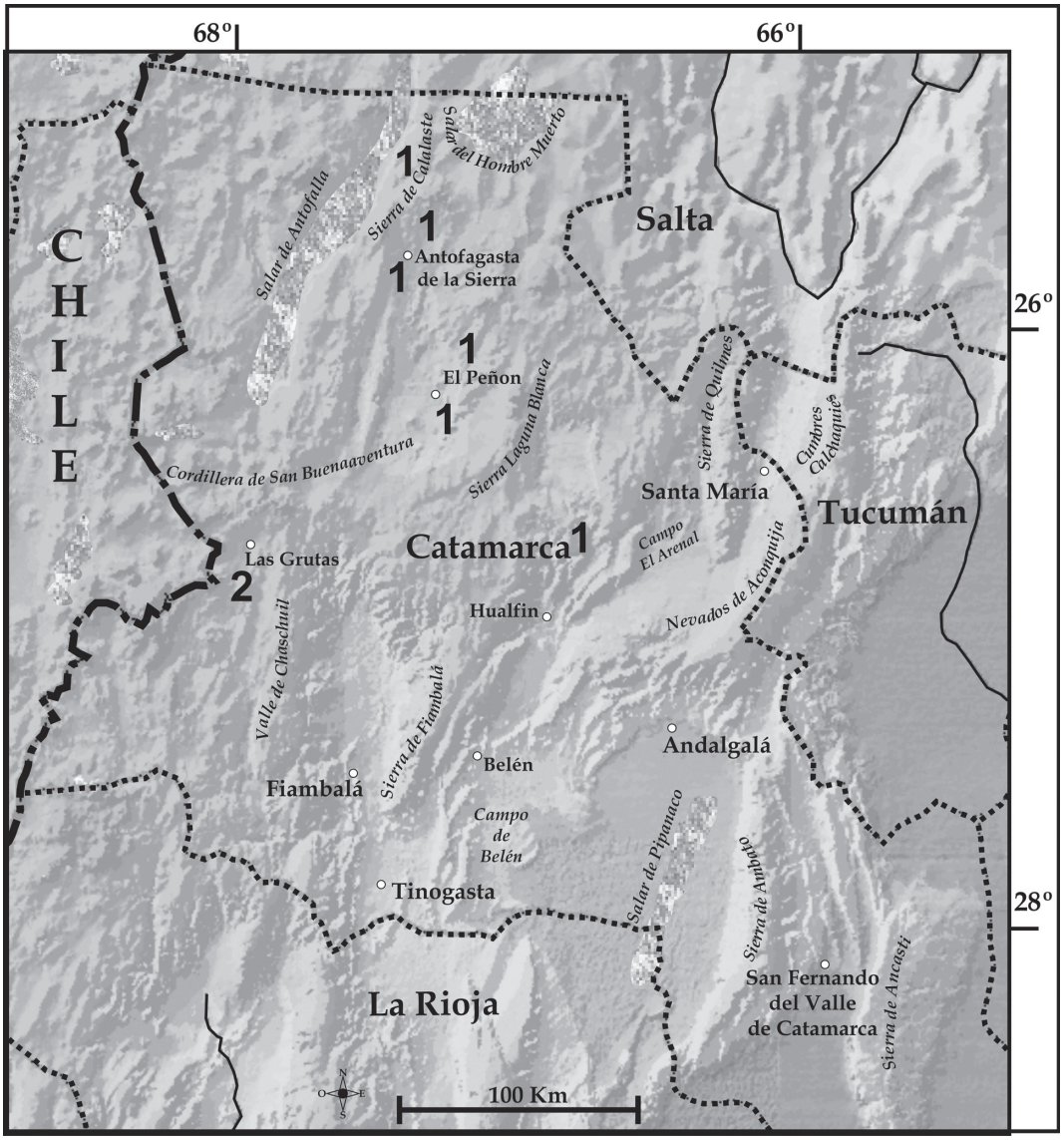

FIGURE 11. Map of Catamarca province (Argentina) showing known vouchered localities of *Phymaturus laurenti* n. sp. (1) and *Phymaturus antofagastensis* (2). *Phymaturus laurenti* n. sp. = Between Antofagasta and Salar del Hombre Muerto, El Peñón, South of El Peñón; Sierra de Calalaste, Cuesta de Randolfo. See text and Appendix 1.

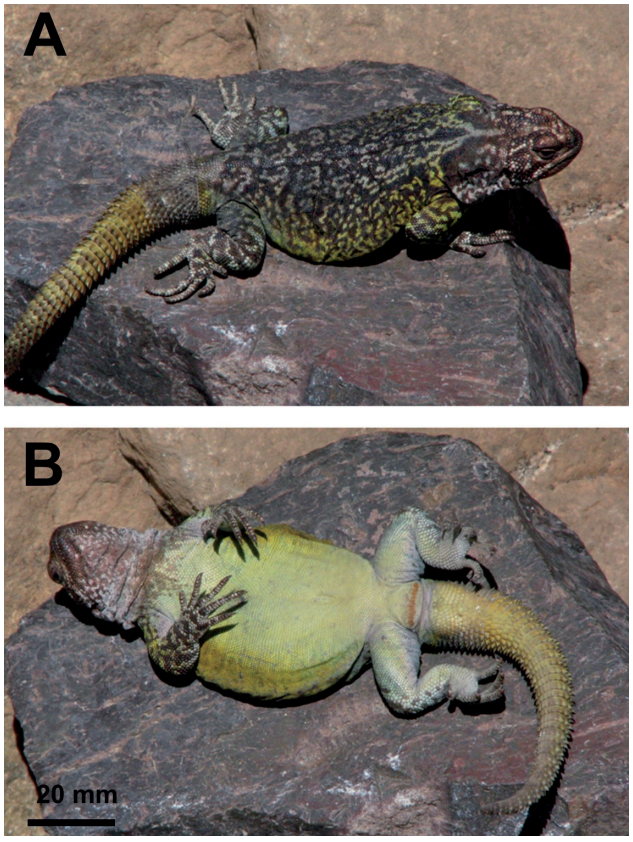

FIGURE 12. A) and B) Dorsal and ventral views of the holotype of *Phymaturus querque* n. sp. FML 21556.

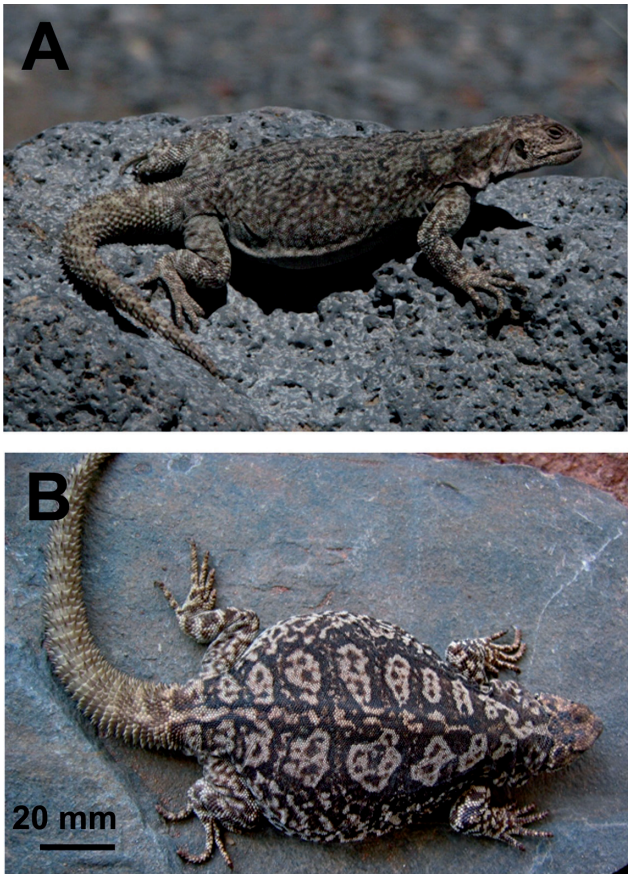

FIGURE 13. A) and B) Dorsal and ventral views of a female of *Phymaturus querque* n. sp. FML 21211 and *Phymaturus roigorum* MCN 1962.

Cei, L. Cei and R. Ferreira col. 01/06/1972. MACN 34514 (2 males, one female, two juveniles). Laguna Blanca. Neuquén. G. Gnida col. 1988.

Diagnosis: Phymaturus querque n. sp. belongs to the *palluma* group because it has short non imbricate superciliaries, rugose dorsal scales on tail, usually fragmented subocular and undifferentiated chinshields. *Phymaturus querque* differs from all members of the "puna clade" because it lacks the spray pattern typical of those species. Species morphologically closest to *Phymaturus querque* are *Phymaturus roigorum* and *Phymaturus dorsimaculatus*. Unlike *P. roigorum,* males of *P. querque* exhibit yellow color on flanks, shoulders and fore limbs while in *P. roigorum* this color is restricted to the tail. Female of *P. querque* has a reticulate but diffuse dorsal pattern while in *P. roigorum* its pattern is more conspicuous, and in most of them exhibits a typical ocellate pattern (Figs. 12 and 13). Female of *P. querque* shows a scapular pattern formed by vertical bars similar to the pattern present in *P. dorsimaculatus* but absent in *P. roigorum*. Males of *P. querque* do not exhibit a melanic throat, while in *P. dorsimaculatus* it is common in adult males. Females of *P. dorsimaculatus* exhibit a typical pattern formed by black bars on their anterior flanks and along their dorsum a chain of paravertebral irregularly shaped black spots connected between the level of neck and hindlimbs (absent in females of *P. querque*). *P. querque* exhibit fewer scales around midbody (= 205.3; SD: 11.8; *P. dorsimaculatus:* 233.1; SD: 16.7).

Description of holotype (Fig. 12): Male. SVL 92.0 mm. Head length 18.1 mm. Head width 18.3 mm. Head height (at parietal) 10.2 mm. Axilla-groin 47.7 mm (51.8% of Snout-vent length). Tail length (regenerated) 89.1 mm. Body moderately wide, trunk width: 34.5 mm (37.5% of SVL). Twenty two smooth dorsal head scales. One scale organ in each postrostral. Nasal bordered by nine scales, not in contact with rostral. Canthal separated from nasal by three scales. Flat loreal region. Thirteen enlarged supralabial scales with two upturned but not contacting subocular. Seven enlarged infralabials. Oval auditory meatus with two conical projecting scales on the anterior margin.

Auricular scale absent. Ten convex, juxtaposed temporals. Rostral undivided. Mental subpentagonal, in contact with six scales. Interparietal bordered by eight scales. Frontal region without an azygous scale. Supraorbital semicircles inconspicuous. Six enlarged supraoculars. Eleven juxtaposed flat superciliaries. Subocular fragmented in three scales and separated from supralabials by two-four rows of lorilabials. Preocular separated from lorilabial row by one scale. Round scales of throat flat, and juxtaposed. Sixty-eight gulars between auditory meata. Well developed lateral nuchal folds, with granular scales over longitudinal fold. Antehumeral pocket well developed. Seventy-four scales between auditory meatus and shoulder. In ventral view, gular fold well developed and posterior gular folds present with with one or two enlarged scales on the borders of their anterior margins. Round, smooth, juxtaposed dorsal scales. Thirty-eight dorsal scales along midline of the trunk in a length equivalent to head length. Scales around midbody: 210. Mid-dorsal scales enlarged in comparison to those on flanks. Ventral scales larger than dorsals. Ventral scales between mental and precloacal pores: 203. Thirteen precloacal pores. Brachial and antebrachial scales smooth with rounded posterior margins. Flat, round, smooth supracarpals. Subdigital lamellae of fingers with 3-5 keels. Number of subdigital lamellae of fingers I: 10; II: 13; III: 18; IV: 20; V: 14. Moderately long claws. Convex, imbricate supradigital lamellae. Infracarpals and infratarsals with round margins and 1-3 obtuse mucrons. Smooth supratarsals, with round posterior margins. Subdigital lamellae of toes I: 11; II: 15; III: 17; IV: 24; V: 16.

Color of holotype in life (Fig. 12): Brown head with black and light brown spots irregularly distributed over dorsum and sides. Thin white oblique stripe crossing upper temporal region. Gray dorsum of body and flanks. A vertebral light gray stripe present over dorsum of neck. This stripe bifurcates reaching the level of shoulders (forming a "Y"). Yellow scapular spot present with black color in its center. Thick black reticulation over trunk dorsum forming ocelli with black spots in their centers. This reticulation is fading over flanks where yellow color is conspicuous. Yellow forelimbs with a black variegation. Gray hind limbs. Yellow tail without pattern. Partially melanic throat and chest. Light yellow belly, ventral surface of thighs, cloaca, tail, and limbs.

Variation: Based on four females and three males (including IBA specimens). SVL 103.8-73.9 mm (93.1; 10.7). Head length 15.4-19.9 mm (18.2; 1.7). Tail length 70.7-90.5 mm (81.7; 8.8). Scales around midbody 194-228 (205.3; 11.8). Dorsal head scales 20-25 (21.7; 1.5). Ventrals 165-203 (183.2; 14.0). Scales surrounding interparietal 6-9 (8.0; 1.0). Scales of neck along longitudinal fold from posterior border of auditory meatus to shoulder 71-100 (78.6; 9.1). Gulars 68-85 (78.0; 7.9). Scales between rostral and frontal 7-11 (9.2; 1.2). Conspicuous sexual dichromatism (Figs. 12 and 13). Males with brown or gray dorsum of head with black and gray spots irregularly distributed. Gray background color of trunk with black markings which can or cannot form ocelli over vertebral and paravertebral regions. Scapular region with a bright yellow spot with black

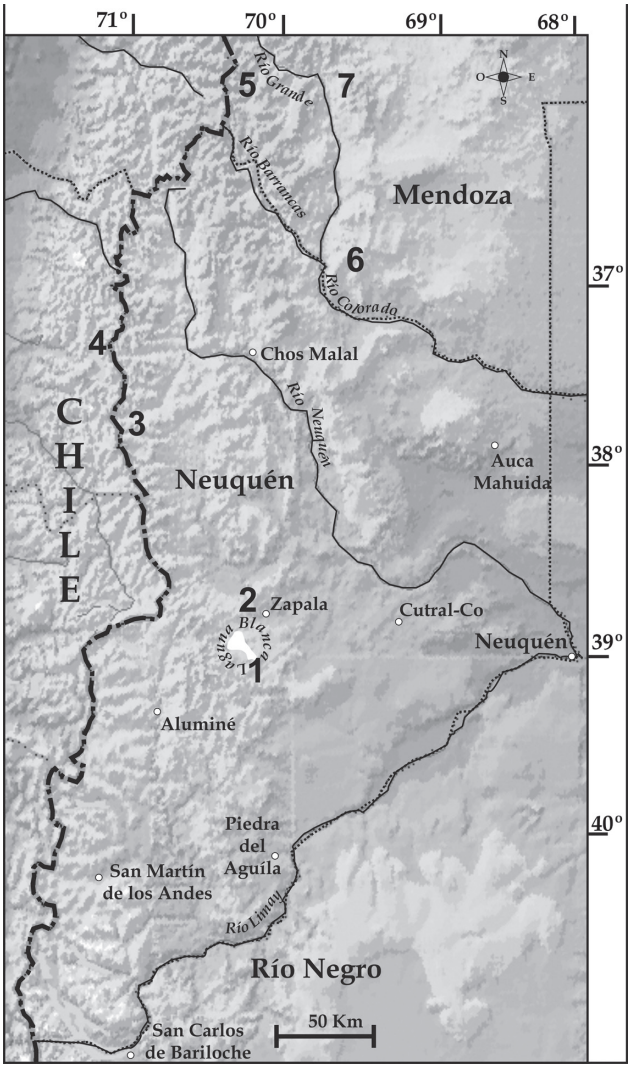

FIGURE 14. Map of Neuquén province (Argentina) showing type locality of *Phymaturus querque* n. sp. (1 and 2) and the other species of the *Phymaturus palluma* group: *Phymaturus dorsimaculatus* (3), *Phymaturus vociferator* (4), *Phymaturus verdugo* (5), *Phymaturus roigorum* (6), *Phymaturus palluma* (7).

in its center. Yellow flanks with black reticulation. Gray to yellow forelimbs and light yellow to gray hind limbs. Yellow tail without pattern. Almost melanic throat and chest. Bright yellow abdominal region, cloaca, and ventral surfaces of tail, forelimbs and hind limbs. Generalized color of head, trunk, tail and limbs gray in females. Over dorsum of trunk several black and brown markings of irregular shape are distributed not forming a regular pattern. Scapular region with a gray conspicuous spot with brown to dark gray color on its margins (homologous to the scapular yellow spot of males). Gray throat, chest, abdominal region, ventral surfaces of tail and limbs, without pattern.

Etymology: the word *querque* means "lizard" in the Mapuche language (original inhabitants from southwestern of Argentine and southeastern Chile).

Distribution (Fig. 14): Only known for the rocky outcrops near the lake (southern shore of Laguna Blanca), Neuquen, Argentina.

Key to species of the *Phymaturus palluma* group

Square shaped short non-imbricate superciliaries; scales of tail with rugosities; strongly spinose tail; undifferentiated chinshields; sometimes divided row of precloacal pores; adult males with black spotted or completely melanic chests

1. Dorsal pattern formed by a widespread black or dark brown reticulation; male temporal scales "seed" type with rugosities; males with yellow tails.....2
   Dorsal pattern formed by a homogeneous fine spotting ("spray"); smooth male temporal scales; males with brown/gray tails (Puna Clade *sensu* Lobo and Quinteros, 2005).....3
2. Adult males and females with strongly melanic head and necks; light brown females; both males and females with fine dorsal reticulation (southernmost Andean region of Mendoza) .... *Phymaturus verdugo*
   Adult males with attenuated head melanism ("dirty heads") or absolutely absent 6
3. Males with homogenous yellow color over their dorsum (without brown scales dispersed within this color); gray females, without flank coloration (Reserva San Guillermo, northwestern San Juan, Argentina)..... *Phymaturus punae*
   Males with small brown spots conspicuous; females with orange-red flank coloration 4
4. Males with four-five brown markings over their heads ("dice pattern"); "spray" dorsal spotting pattern partially aggregated (no reticulation); strongly keeled infratarsal and infradigital scales of fifth toe (five or more keels); females with transversal lighter stripes over their backs (Fig. 10) (Andean mountains close to Paso San Francisco, Catamarca).....*Phymaturus antofagastensis*
   Males without spotted pattern of head; slightly keeled infratarsal and infradigital scales of fifth toe (three or fewer); dorsal pattern of small brown spots, homogeneous in both sexes; females without transversal stripes 5
5. Light gray or white vertebral line present; not enlarged scales in the center of chest; males without enlarged scales posterior to the cloacal opening (Sierra de Famatina, La Rioja) .... *Phymaturus mallimaccii*
   Vertebral line absent; enlarged scales in the center of chest present; males with enlarged scales posterior to the cloacal opening (Eastern Puna of Catamarca)..... *Phymaturus laurenti* n. sp.
6. Dorsum with a thin to thick reticulation pattern; attenuated melanism of heads in males; females with almost no pattern, with white sides of heads (Fig. 15C).....7
   Dorsum with a thick reticular pattern; males without melanic heads (reticulated heads); females with reticulated pattern similar to males.....8
7. Dorsum with a thin reticulation pattern; less often fragmented subocular scale, (andean slopes of Mendoza between 33.5-36.0° of S latitude) .... *Phymaturus palluma*
   Dorsum with thick reticulation, subocular scale often fragmented, (Sierra de Uspallata in Mendoza and southern pre-Andean region of San Juan)..... *Phymaturus "adrianae"*
8. Yellow dorsum of trunk; melanic throats of males and females; females with a pattern of vertical scapular black bars; yellow scapular without a black mark at its center 9
   Light gray/brown dorsum of trunk in both sexes, never yellow, only sometimes restricted to the flanks; variegate throats of males and females; a black mark in the center of the yellow scapular spot.....10
9. Second chinshields in contact; scapular vertical black bars absent in males; no vocalizations (Copahue volcano area, Neuquén , Argentina)... .....*Phymaturus dorsimaculatus*

Second chinshields separated; in males scapular black bars fused forming a conspicuous lateral melanic area between sides of neck shoulders and flanks; vocalizations (according to Pincheira Donoso 2004) (National Park of Chile La Laja)..... *Phymaturus vociferator*

10. Yellow color in males restricted only to tails; female pattern quite similar to that of males, sometimes with paravertebral occellations (Sierra El Nevado,and Payún, southeastern Mendoza, Argentina) ..... *Phymaturus roigorum*

Yellow color of tails reaching flanks (never dorsum of trunk); dorsal pattern in females less conspicuous (National Park Laguna Blanca, Neuquén, Argentina) .....*Phymaturus querque* n. sp.

Discussion

Comments on the described species of Phymaturus and new morphological characters

In this study we provide the description of four new species of *Phymaturus* and at the same time we describe several new morphological characters that are useful for the recognition of different lineages within both the *palluma* and *patagonicus* groups. This morphological variation can also be analyzed in a phylogenetic context and be informative for recovering phylogenetic relationships. As new useful characters within the *patagonicus* group we describe the presence of a dorsal pattern with its background covered by a scattering of small or large black markings; chinshields well differentiated or undifferentiated from the rest of the gular scales (enlarged); margins of chinshields marked by dark pigmentation (or not); colored pattern of posterior surfaces of thighs formed by brown, black and white scales irregularly distributed (or light gray with a few small dark spots); internasal region concave (versus flat or convex); pigmentation of subdigital scales restricted to the space between keels (or distributed all over scales); presence or absence of thin black transversal lines over dorsum; throats immaculate, with small dark scattered spots or with thick variegation; within the *palluma* group we describe dorsal melanism of neck interrupted in the midline; orange or yellow color in flanks of females (puna clade); vertebral light or dark gray line; presence or absence of a scapular yellow spot; adult males with attenuated head melanism ("dirty heads"); among the most informative characters. A new formal phylogenetic analysis of *Phymaturus* is in preparation, but it is beyond the scope of the present study. Nevertheless, it is hoped that the characters described here, and their potential utility as synapomorphies will facilitate future research on this important component of the austral South American herpetofauna.

In a previous study (Lobo and Quinteros, 2005a) observations of a population of *Phymaturus* of Laguna Blanca (*P. palluma* LB) were included; at that time, only specimens collected in the seventies by J. M. Cei were available for study. This material was artificially darkened probably by an extended exposure to formalin so many characters that referred to color and patterns were impossible to analyze. New samples available at present (FML) allowed us to describe the new taxon, *Phymaturus querque.* Males of this species lack a complete pattern of melanistic heads as in other members of the *palluma* group, exhibiting the same "naked" heads as *P. roigorum* (Payunia region of southern Mendoza, *P. palluma* PA of Lobo and Quinteros, 2005a); they also share a similar pattern of variegate throats with this species. According to Roig-Juñent *et al.* (2006) this austral area of Mendoza and northern and western areas of Neuquén make up an area of endemism called "Payunia". A relationship between species of these two areas in the *patagonicus* group and the *palluma* group was postulated in Lobo and Quinteros (2005a, page 165) (*P. zapalensis* of Laguna Blanca and *P. payuniae* and *P. nevadoi; P. palluma* LB and *P. palluma* PA). *Phymaturus laurenti* was studied first in a previous revision (Lobo and Quinteros, 2005a: "cf. *antofagastensis* SC").

Taxonomic consideration about species neither studied nor used for comparisons:

With the recent designation of the holotype of *Centrura flagellifer* Bell (1843) as the neotype of *Phymaturus palluma* Molina (1782) by the International Commission on Zoological Nomenclature (2005), the type locality of *Phymaturus palluma* became problematic. It is likely that Charles Darwin collected the holotype of *Centrura flagellifer* during his journey from Santiago, Chile to Mendoza, Argentina, and on his return. Darwin collected and described briefly a viviparous lizard from that place (his short description is quite significant: "dirty yellow" color is typical of *Phymaturus* of the *palluma* group (no species of *Liolaemus* of this region exhibits this

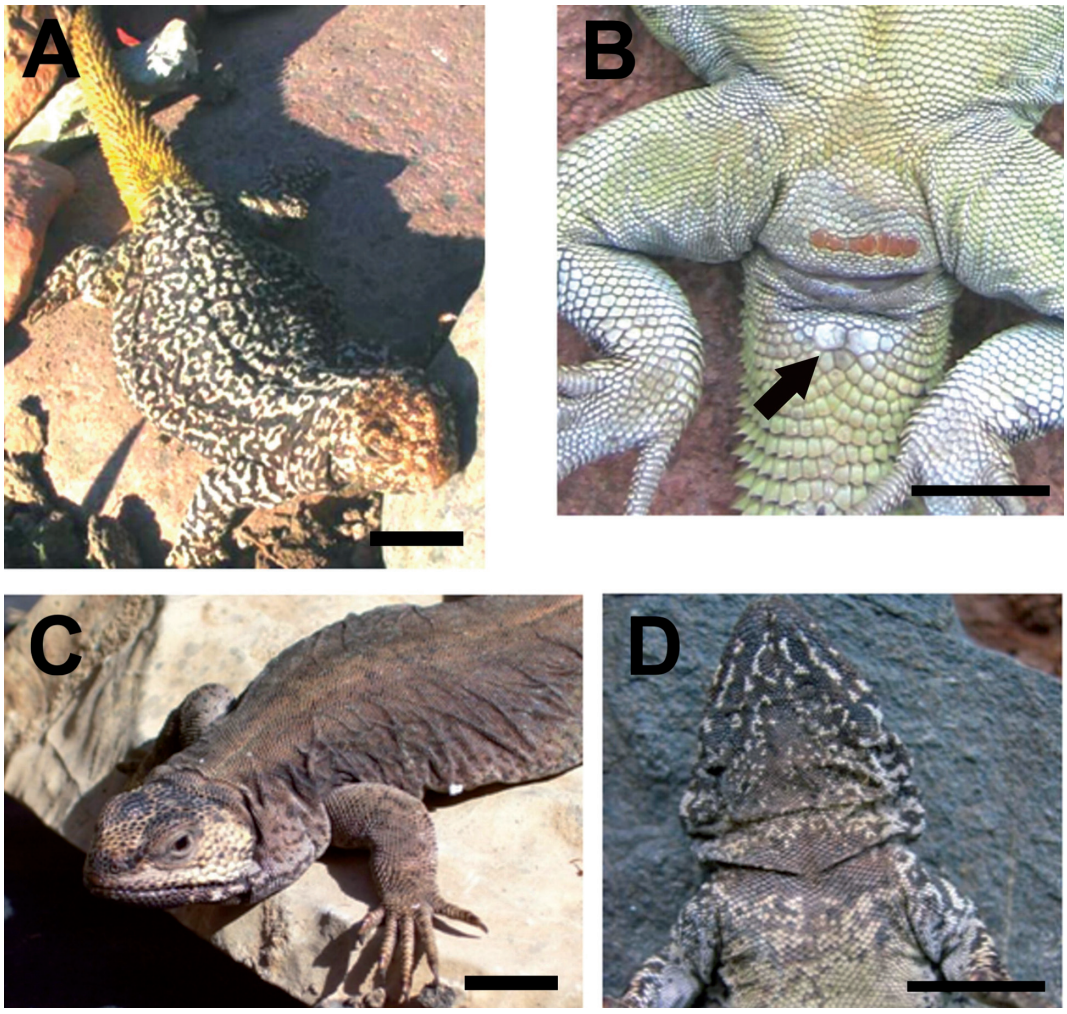

Figure 15. Characters varying in the *Phymaturus palluma* group. A) Male of *Phymaturus roigorum* MCN 2098 (yellow tail); B) Male of *Phymaturus laurenti* n. sp. MCN 2855(enlarged poscloacal scales); C) female of *Phymaturus "adrianae"* ("white face") from Portezuelo, San Juan, picture of E. Sanabria; D) Male of *Phymaturus roigorum* (variegation in throat pattern) MCN 1972. Line = 10 mm.

color). In another contribution (Lobo and Etheridge, *in prep.*) we provide a re-description of Darwin's specimen, we provide two morphological characters that differentiate Bell's type from other populations from Chile and Argentina, previously assigned to this species. Last November (2009) specimens from the place where Darwin got his "viviparous lizard" were collected, confirming the identity of the type. This study reveals at the same time that *Phymaturus gynechlomus* Corbalán, Scolaro and Debandi 2008 is a junior synonym of *Phymaturus palluma.* And, because populations of Sierra de Uspallata and southern San Juan, have been verified to be independent lineages from *P. palluma,* they should be formally described (not valid *"adrianae"* = nomen nudum).

In the present contribution we recognize 27 valid species plus a differentiated population of the *palluma* group, the one named by Pereyra (1992b) *"adrianae",* we do not consider valid *Phymaturus agilis* (Scolaro *et al.* 2008). It is a brown morph of *Phymaturus spectabilis* as we demonstrate in a separate contribution (Lobo, Cruz and Abdala, *in prep.*) based on the study of new samples and mainly due to the discovery of a gravid female of *P. spectabilis* that gave birth to two newborns, one with the *"agilis"* pattern and the other with the typical ocellate *"spectabilis"* pattern). *Phymaturus desuetus* (Scolaro and Tappari, 2009) was not included in comparisons in this study because no specimens were available. This last species was described based on a single specimen from the same area of distribution of *P. spectabilis*. We consider that it can also represent another case of polymorphism which deserves more careful studies.

The validity of *Phymaturus dorsimaculatus* Lobo and Quinteros, 2005

Pincheira-Donoso *et al.* (2008) suggest considering *Phymaturus dorsimaculatus* Lobo and Quinteros, 2005a as a junior synonym of *Phymaturus vociferator* Pincheira-Donoso, 2004. They don't provide a list of individuals used in their comparisons (type series, or topotypes), a detailed analysis of characters, etc. They emphasized the fact that those populations are inhabitants of close areas. In a recent meeting of the AHA (Asociación Herpetologica Argentina) Morando *et al.* (2009) showed a molecular tree of *Phymaturus;* presenting each species more closely related to other terminal taxa and not forming a sister taxa relationship between them, a fact that reinforces the idea of two independent species. At present, the recognition of these two species as separated entities is a subject that should be studied in detail taking into consideration all the available information preferably including the morphological analysis of samples from both places.

On the taxonomic content and distribution of the genus

In Table 1 we summarize all information available at present, after adding these new taxa described in the present contribution and what we know about distributions.

Species considered here as "not restricted species" in Table 1 involve fewer than a third (7/27), but only three of these are really widely distributed.

Table 1. Species content of the genus *Phymaturus* (27). Original descriptions and type locality are indicated for each case. The last column show a distributional remark where R = restricted to the type locality; NR = not restricted (two or more localities are known). See comment and discussion in text.

	Original description	Type locality	
palluma group			
Phymaturus dorsimaculatus	Lobo and Quinteros 2005	Copahue, Ñorquin. 37°49'S, 71°06'W. Neuquén	R
Phymaturus palluma	Molina 1782	Cordón del Portillo, Mendoza	NR[1]
Phymaturus querque	Lobo, Abdala and Valdecantos	Laguna Blanca, Neuquén	R
Phymaturus roigorum	Lobo and Abdala 2007	Puesto Rojas, El Nevado, Mendoza	NR
Phymaturus verdugo	Cei and Videla 2003	Río Grande 35°24'S, 70°15'W, near Peteroa Volcano, Mendoza	N
Phymaturus vociferator	Pincheira Donoso 2004	Laguna del Laja, Región Bío Bío, Chile	R
Phymaturus antofagastensis	Pereyra 1985	Los Nacimientos, Antofagasta de La Sierra, Catamarca	R
Phymaturus laurenti	Lobo, Abdala and Valdecantos	10 km S of El Peñón, Antofagasta, Catamarca	NR
Phymaturus mallimaccii	Cei 1980	Cueva de Pérez, 4200 m, Sierra Famatina, La Rioja	R
Phymaturus punae	Cei, Etheridge and Videla 1983	Reserva Provincial San Guillermo, San Juan	N
patagonicus group			
Phymaturus calcogaster	Scolaro and Cei 2003	Laguna de La Vaca 42°28'45"S, 67°21'54"W, Chubut	R
Phymaturus ceii	Scolaro and Ibarguengoytia 2007	near Chasico 40°23'02"S, 69°00'33"W, RioNegro	NR
Phymaturus desuetus	Scolaro and Tappari 2009	Barda Sur Ingeniero Jacobacci, Río Negro	R
Phymaturus etheridgei	Lobo, Abdala and Valdecantos	Between Jacobacci and Molihue (provintial road 76), Rio Negro	R
Phymaturus felixi	Lobo, Abdala and Valdecantos	108 km S of Paso de Indios, Chubut	R
Phymaturus indistinctus	Cei and Castro 1973	Las Pulgas, 50 km SW Lago Musters, Chubut	R
Phymaturus manuelae	Scolaro and Ibarguengoytia 2008	26 km W of Comallo, Rio Negro	R
Phymaturus nevadoi	Cei and Roig 1975	Agua de la India Muerta, El Nevado, Mendoza	R
Phymaturus patagonicus	Koslowsky 1898	Dolavon, Chubut	NR
Phymaturus payuniae	Cei and Castro 1973	5 km from Volcán Payún, 2000 m, Mendoza	R
Phymaturus somuncurensis	Cei and Castro 1973	Laguna Raimundo, Somuncurá, Río Negro	R
Phymaturus castillensis	Scolaro and Pincheira Donoso 2010	Sierra Castillo, Chubut	R
Phymaturus spectabilis	Lobo and Quinteros 2005	28 km S of Ingeniero Jacobacci, Río Negro	NR
Phymaturus spurcus	Barbour 1921	Estancia Huanuluan, Río Negro	R
Phymaturus tenebrosus	Lobo and Quinteros 2005	20 km S of Cerro Alto, Río Negro	R
Phymaturus videlai	Scolaro and Pincheira Donoso 2010	Buen Pasto, Chubut	R
Phymaturus zapalensis	Cei and Castro 1973	Laguna Teru, 1200 m, 40 km W Zapala	NR

[1] the problem of finding the type locality of *Phymaturus palluma* is faced in another contribution Lobo and Etheridge (see comments in text).

Populations of *palluma* from Mendoza, as mapped in Lobo and Abdala (2007), have a north-south range within a distance of 250 km between 32° and 35°S making this species the most widely distributed of the genus (Corbalán *et al.* 2009 assign populations of western slopes of the Andes in Mendoza argentine province to their previously described species *P. gynechlomus*); *P. laurenti* which we describe in the present study, is distributed in the east puna region of Catamarca province, in a north-south range within a distance of 150 km (between 27° and 26°30'S latitude). *Phymaturus patagonicus,* whose type locality was restricted to Dolavon (Chubut, province) in Lobo and Quinteros (2005b), is also distributed in populations to the west, reaching Meseta el Sombrero (170 km aprox.). *Phymaturus roigorum* is found in Payún and Sierra del Nevado (around 100 km in a distance between both places). *Phymaturus ceii* is found around Chasicó (type locality) and El Cuy in an area not larger than 60 km (Scolaro and Ibarguengoytia, 2007; Lobo and Quinteros, 2005a: "*patagonicus* EC"). *Phymaturus palluma* represents an unresolved problem at present, several populations (from Argentina and Chile) were assigned and until the type locality of this species is fixed, it is not possible to describe precisely the species distribution (*see* Lobo and Abdala, 2007). Other species indicated as "not restricted" were only reported for no farther than 20-25 km from their type localities. The degree of restriction of distribution in this clade of iguanian does not seem to be the effect of incomplete sampling; most species are distributed close to main national roads, places of easy access. What it is evident for herpetologists is that these typical rocky patches where *Phymaturus* lives are often small isolated outcrops and their preferred environments are completely fragmented (with the exceptions described above (NR). Taking into consideration its peculiar biology (biannual reproductive cycles with females giving birth every two years, only one or two newborns), their restriction in microhabitat (absolute saxicolous) and their diet (herbivorous) researchers should warn official fauna departments about their fragility and promote careful conservation plans.

Resumen

Luego del estudio de una rica colección de *Phymaturus* de tres instituciones argentinas y de muestras adicionales colectadas en los últimos dos años descubrimos varias poblaciones de status taxonómico incierto. Basados en 93 caracteres morfológicos de escamación, patrón de colores, pliegues gulares y nucales, poros precloacales y datos morfométricos, concluimos que al menos cuatro de aquellas son linajes independientes que requieren descripción formal. Caracteres relacionados con el dimorfismo y dicromatismo sexual así como el cambio ontogenético de varios otros, desde especímenes juveniles hasta adultos, son descriptos. De acuerdo con la revisión más reciente del género (Lobo y Quinteros, 2005a) y considerando las últimas descripciones realizadas en los últimos cuatro años la composición taxonómica del género fue elevada a 23 especies. En esta contribución proveemos de la descripción formal de cuatro nuevos taxa incluyendo su diagnosis y comparaciones detalladas con otros miembros de sus grupos de especies. Dos nuevas especies pertenecen al grupo *patagonicus* (provincias de Chubut y Rio Negro, en Patagonia entre 49° y 41° de latitud) mientras otras dos pertenecen al grupo *palluma* (provincias de Neuquén y Catamarca, oeste de Argentina a 39° y 27-26°30' de latitud respectivamente). Con la excepción de un caso para el cual se reportan cuatro localidades todas las otras nuevas especies están restringidas a sus localidades tipo. Este hecho confirma lo que conocemos para la mayoría de las especies del género como un patrón histórico-distribucional común.

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Appendix 1

Other materials examined in this study are listed here. Acronyms of herpetological collections are as follows: IADIZA (Instituto Argentino de Investigaciones de las Zonas Aridas, Mendoza, Argentina), IBA (Instituto de Biologia Animal, Mendoza, Argentina), FML (Fundacion Miguel Lillo, Tucumán, Argentina), MACN (Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina), MCN (Museo de Ciencias Naturales, Universidad Nacional de Salta, Argentina), MCZ (Museum of Comparative Zoology, Harvard, USA), MVZ (Museum of Vertebrate Zoology, Berkeley, USA), SDSU (San Diego State University, San Diego, USA), UNCO (Universidad Nacional del Comahue), REE-CSUN (Robert E. Espinoza, California State University), REE-SDSU (Richard E. Etheridge, San Diego State University).

Phymaturus "adrianae": SDSU 1969-1970. Argentina: Prov. Mendoza: Dpto. Las Heras: 20 km NE Uspallata, 2500 m. R. Etheridge. 26/01/1983. SDSU 3387. Argentina: Prov. Mendoza: Dpto La Heras: 27 km NE Uspallata. 32°28'52.2"S, 69°09'59.2"W. 2768 m. R. Etheridge, R. Espinoza, S. Torres, E. Pereyra. 10/02/1995. SDSU 3388. Argentina: Prov. Mendoza: Dpto La Heras: 27 km NE Uspallata. 32°28'52.2"S, 69°09'59.2"W. 2768 m. R. Etheridge, R. Espinoza, S. Torres.MVZ 145146. Depto. Las Heras, Pampa de Canota, 20 km E, 8 km S Estancia Uspallata; elevation 3000 m. Prov. Mendoza, Argentina. R. Sage col. 12/11/1968. 32°65'S, 69°27'W. MVZ 180771-74. Depto. San Carlos, Quebrada Cruz de Piedra. Prov. Mendoza, Argentina. R. Sage. 28/12/1975. 34°26'S, 68°90'W. MVZ 92902, 04, 08. (DS) Dpto. Las Heras, Mendoza, Argentina. 16/12/1967. R. Sage col. REE-SDSU 2306-07, 2312-13, 2315 (DS). 20 km NE Uspallata, 2500 m. R. Etheridge col. 26/01/1983. IADIZA-CH. S/N (2 specimens) Paramillos, Prov. de Mendoza, Argentina. IBA 760 (4 specimens). Paramillos, Mendoza. 2000 m. Argentina. 1/71. L. G. Castro col. MCN 2650-53, 2659-62, 2696-2708. El Portezuelo, San Juan Province, Argentina. Espinoza, R. E.; F. Lobo; E. Sanabria; L. Quiroga col.

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Phymaturus castillensis: IBA 869 (3 individuals). Sierra Castillo. N. W. Lago Colhue Huapi. 1000 m. Chubut. Argentina. January 1973. J. M. Cei, L. M. Cei and T. Ferreyra collectors.

Phymaturus ceii: MCN 910-918. Argentina, Prov. de Rio Negro, Dpto. 25 de Mayo, Ruta Prov. 8, 17 km S de San Antonio del Cuy. L. Avila; M. Morando and D. Pérez cols. 11/03/1999. MCN 908-909 (CS). Ruta Provincial 8. A 17 km S de San Antonio del Cuy. Prov. Rio Negro, Argentina. 40°17'13"S, 68°27'32"W. L. Avila col.

Phymaturus dorsimaculatus: MCN 1573 (Holotype). Copahue, Dpto. Ñorquin. 37°49'S, 71°06'W. Neuquén, Argentina. Abdala, C.; Avila, L.; F. Lobo; M. Morando, col. 13/01/1999. MCN 1571-72, 1574-75 (Paratypes). Same data as holotype. MCN 1568-69. Termas de Copahue, Dpto. Ñorquin, Neuquén, Argentina. 37°49'14"S, 71°05'12"W; 2050 m. 13/01/1999. MCN 1566-67. Copahue, Dpto. Ñorquin, Neuquén. MVZ 232503. Depto. Ñorquin, Barda W Termas de Copahue; elevation 2050 m. Prov. Neuquén, Argentina, M. I. Christie. 29/12/1994. MCN 1566-67 and MCN 1487-88 (CS) Copahue, Dpto. Ñorquin, Neuquén, Argentina. D. Pérez col. 01/1999.

Phymaturus excelsus: MCN 1582 (Holotype). Ruta prov. 6, 1 km NW of Ojo de Agua, Dpto. Ñorquinco, Rio Negro, Argentina. L. Avila and M. Morando, collectors. 41°32'30"S, 69°51'33"W; 1141 m. MCN 1386, 1388 (Paratypes). Ojo de Agua. Ruta 6. Dpto. Ñorquinco, Rio Negro, Argentina. Abdala, C.; F. Lobo; I. Martínez Oliver; S. Quinteros. MCN 922 (CS), 1583-1586. Same data as holotype. MCN 1587-88. No data.

Phymaturus indistinctus: IBA 666-1 (holotype), IBA-2, IBA-3. 2 km O de Las Pulgas (lago Munsters), prov. del Chubut, Argentina. 700-800 m. J. M. Cei and L. Cei cols. 23/01/1970. MCN 1274-77. Las Pulgas (cerro frente a Gruta de la Virgen). Dpto. Sarmiento, Prov. de Chubut, Argentina. Abdala, C.; F. Lobo; I. Martinez; S. Quinteros cols. MCN 810 (CS) Las Pulgas, 50 km SO de Lago Munster. L. Avila col. Ruta Prov. 20, Sierra de San Bernardo, 19 km W Los Manantiales, 669 m. 45°27'41"S, 69°42'52"W. Dpto. Rio Senguer, Prov. de Chubut, Argentina. L. Avila and M. Morando cols. MCN 1482 (CS) Ruta Prov. 20, 4 km N de intersección ruta prov. 22, 502 m. 45°25'54"S, 69°50'25"W. Dpto. Rio Senguer, Prov. de Chubut, Argentina. L. Avila and M. Morando cols.

Phymaturus laurenti: MCN 313-317, 320, 322. Cuesta de Randolfo. Catamarca. Abdala, C.; R. Espinoza, F. Lobo, I Martínez Oliver cols. 18/01/2001. MCN 306-307, 323-327. Cuesta de Calalaste. Catamarca. Abdala, C.; R. Espinoza, F. Lobo, I Martínez Oliver cols. 20/01/2001. MCN 1919-21. Norte de Antofagasta de la Sierra, Catamarca. 25°38'06.00"S, 67°13'53.65"O". Casimiro, B., Espinoza, R., Lobo, F., S. Quinteros col. 19/01/2006. MCN 3133 al este de El Peñon, camino al cerro Galán. Antofagasta de la Sierra, Catamarca. 26°20'28.88"S, 67°08'01.51"W. Chocobar, Raúl.

Phymaturus mallimaccii: REE-CSUN 183, 489-491.Cueva de Perez, Sierra de Famatina, Prov. de La Rioja. Argentina. R. Espinoza and F. Cruz cols. MCN 920 and MCN 1483-84 (CS). Camino a la Mejicana, 3430 m. 28°54'43"S, 67°42'47"W. Dpto. Famatina. Prov. de La Rioja. Morando, M.; L. Avila y L. Belver cols. 07/12/1999.

Phymaturus manuelae: UNCO-PH. 201-202. (Paratypes). JAS 1251. Adjacent to National Road 23, 26 km W of Comallo, Rio Negro Province, Argentina. Collected by N. R. Ibargüengoytía, J. A. Scolaro and J. Gutiérrez, 20 December 2007.

Phymaturus nevadoi: IBA 999 (3 specimens) (type series). Agua de la India Muerta, 1750 m, Macizo Nevado, SE Mendoza. XII/73. J. M. Cei, J. Williams, Stassi, Castro cols.

Phymaturus palluma (= *Phymaturus gynechlomus*): MCN 3130-31. Camino al Portillo Argentino (Cordón del Portillo) 33°36'53.8"S, 69°29'16.7"W, Mendoza, Argentina. 24/11/2009. C. Abdala, V. Juárez col. MVZ 126991. Dpto Malargüe, Valle Hermoso, Prov. De Mendoza, Argentina. R. Sage col. 05/01/1969. 35°20'S, 70°15'W. MVZ 126992-94. Lago de la Niña Encantada. 6 km E de los Molles, elevation 2000 m. Prov. De Mendoza, Argentina. R. Sage. 09/01/1969. 33°18'S, 69°83'W. MVZ 126995. Dpto Malargüe, en el extremo norte del Valle Hermoso. Prov. De Mendoza, Argentina. R. Sage. 12/01/1969. 35°11'S, 70°10'W. MVZ 126996-126999. Depto. Tupungato, Quebrada de Chupasangral, 4 km NW Cerro Chupasangral; elevation 2800 m. Prov. Mendoza, Argentina R. Sage. 28/01/1969. 33°21'S, 69°51'W. MVZ 127023. Depto. Las Heras, 2 km E Los Hornillos, Prov. Mendoza, Argentina. R. Sage col. 13/02/1970. 32°51'S, 68°99'W. MVZ 127025-27. Depto. Malargüe, 2 km E Agua Botada Prov. Mendoza, Argentina R. Sage col. 24/03/1970. 35°62'S, 69°95'W.

Phymaturus patagonicus: MLP 778, 777 (Lectotype and paralectotype). Territorio del Chubut (Patagonia). SDSU 1980. Argentina: Prov. Chubut: Dpto Gaiman: 40 km WSW Dolavon. R. Etheridge col. 25/02/1983. IADIZA-CH 00080. 40 km W Dolavon, 350 m. Prov. del Chubut, Argentina. J. M. Cei and J. Williams cols. 03/03/1983. IBA 789 (7 specimens). Argentina: Prov. Chubut: Dpto Gaiman: 40 km W Dolavon. Cei J. M.; L. Cei and L. Ferreyra cols. 16/01/1972. MCN 1284-1286. A 40 km W Dolavon. Dpto Gaiman, Prov. de Chubut, Argentina. Abdala, C.; F. Lobo; I. Martinez; S. Quinteros cols. 10/2003. IBA 783 (5 specimens). 20 km. W Sombrero. Prov. del Chubut, Argentina. 15/01/1972. J. M. Cei, L. Cei and R. Ferreira cols. FML 10077-85. 1 km W Intersección Ruta Prov. 53 y 90. 2,2 km SW Meseta El Sombrero. Pto. Paso de Los Indios, Prov. del Chubut. C. Abdala, R. Espinoza and J. Wiens cols. 16/02/2001. MCN 1250-58, 1261. Cerro frente a El Sombrero. Dpto. Paso de Indios. Prov. de Chubut. Argentina. Abdala, C.; F. Lobo; I. Martinez; S. Quinteros cols. 10/03.

Phymaturus payuniae: IBA 769 2, 4-8, 10, 12, 17, 20, 24, 26. (specimens of type series). Payún Plateau, 5 km from the Volcán Payún, 2000 m, Mendoza, Argentina. Cei, J. M., L. P. Castro and T. Ferreyra cols. XII/1971. IADIZA-CH 00087-8, 00087-9. 20 km SE Volcan Payún. 1800 m. Cei and Videla cols. 31/01/1982. SDSU 1981-1984. Argentina: Prov. Mendoza: Dpto Malargüe: 10 km SW base of Volcán Payún. R. E. Etheridge col.

04/02/1983. MCZ 152079-81. Basaltic rocks of the Payún plateau, Mendoza, Argentina. L. P. Castro col. 01/72. REE-SDSU 2330-32, 2339, 2360 (DS). 10 km S base Volcán Payún, Dpto. Malargüe, Prov. de Mendoza. MCN 2878-79. 26/02/2009. V. Corbalan col.

Phymaturus punae: MCZ 19217 (Holotype). 7 km SE refuge de la Reserva Provincial, cerca del Rio San Guillermo, 3500 m. Prov. de San Juan, Argentina, R. Etheridge, J. M. Cei and F. Videla cols. 09/02/1983.MCZ 163982, 84, 86-88. (paratypes). Same data of holotype. SDSU 1978-79. Argentina: Prov. San Juan: Dpto Iglesia: Llano de los Hoyos, Reserva Prov. San Guillermo. R. E. Etheridge col. 09/02/1983. REE-SDSU 2356-57 (DS). Caserones, 4 km SW refuge, Res. Prov. San Guillermo. 3500 m. Dpto. Iglesia, prov. de San Juan, Argentina. 10/02/1983. R. Etheridge col., 2383-84 (DS). Llano de Los Hoyos, 10 km SE refuge, res. Prov. San Guillermo, 3400 m. 09/02/1983. R. Etheridge col. MCN 3114-3126. Reserva San Guillermo, San Juan. J. C. Acosta col.

Phymaturus querque: MVZ 232504-05. Puesto Control, 3.5 km N Co. de 1 Laguna PN Laguna Blanca. 23°80'S, 56°83'W. Dpto. Zapala, prov. de Neuquen, Argentina. 1800 m. 18/03/1994. M. I. Christie col. SDSU 1971. Argentina: Prov. Neuquén: Dpto Zapala: south shore of Laguna Blanca. R. E. Etheridge col.

Phymaturus roigorum: MCN 1963 (Holotype) Puesto Rojas, 16 km. de Ruta Provincial 180. El Nevado. Departamento de San Rafael, Mendoza Province, C. Abdala; R. Juarez; C. Robles col. MCN 1962, same data holotype. FML 17705-708 (Paratypes) same data holotype. MCN 2096-2103 (Paratypes). 6 km S de Real del Molle, sobre la base del volcán Payún Liso, 2128 m s.n.m. 36°28'51,1"S; 69°22'27,9"W. Departamento de Malargüe, Provincia de Mendoza, Argentina. C. S. Abdala, R. Juárez, J. P. Juliá; A. Brunetti col. 05/03/2006. SDSU 1948-51, 56, 62 64-65. Argentina: Prov. Mendoza: Dpto Malargüe: 3 km NW of base of Volcán Payún. R. Etheridge. 04/02/1983. SDSU 1972, 1974-75. Argentina: Prov. Mendoza: Dpto Malargüe: 10 km S of base of Volcán Payún. R. Etheridge. 04/02/1983. REE-SDSU 2323-27 (DS). 4 km W Base Volcán Payún, 200 m, Dpto. Malargüe, Prov. de Mendoza, Argentina. R. Etheridge col. 04/02/1983. IADIZA-CH 00091. Base del Volcán Payún. 1800-2000 m., Prov. de Mendoza, Argentina, J. M. Cei 7 F. Videla cols. 31/01/1982. IBA 733 (5 specimens). Base Campamento. Lado SW del Payún. Mendoza. Argentina. 06/01/1971. L. P. Castro col.

Phymaturus somuncurensis: IBA 470 (2 specimens). (Types). Laguna Raimunda, Meseta de Somuncurá, Prov. de Rio Negro. Argentina. Cei. and Tuzi cols. 10/04/1968. IBA 507 (4 specimens). Circa Laguna Raimunda, Meseta de Somuncurá, Prov. de Rio Negro. Argentina. Cei, Castro and Tuzi cols. 17/11/1968. IADIZA 212. Cerro Corona, Meseta de Somuncurá. Prov. de Rio Negro. Argentina. J. Scolaro col. 16/12/1985. SDSU 1780-1783. Argentina: Prov. Río Negro: Dpto 9 de Julio: 2 km N Laguna Raimundo, Meseta Somuncurá, R. E. Etheridge col. 19/02/1992. REE-SDSU 2433-2435, 2439 (DS). N Laguna Raimundo, Meseta de Somuncura, Dpto. Valcheta, Prov. de Rio Negro, Argentina. R. Etheridge col. 19/02/1983. IADIZA-CH 00212. Co. Corona. Meseta de Somuncura. Prov. de Rio Negro, Argentina. J. A. Scolaro col. FML 1038. Meseta de Somuncurá, Laguna Raimundo (1400 m). Prov. de Rio Negro. Argentina. J. M. Cei col. 19/02/1983. MCZ 156909, 170443-44. Laguna Raimunda, Meseta de Somuncurá, Prov. de Rio Negro. Argentina. Cei. and Tuzi cols. 10/04/1968. MACN 37431-5. 2 km N Casco Cecchi. Meseta de Somuncurá. Río Negro. 13/01/1969. MACN 37436-40 (topotypes). Laguna Raimundo. Meseta de Somuncurá. Rio Negro. 04/03/1991. G. Lingua, M. Canevari, R. Chiesa col.

Phymaturus spectabilis (= *Phymaturus agilis*): MCN 1203 (Holotype). 28 km S of Ingeniero Jacobacci, Rio Negro province, Argentine (on Provintial Road 6). C. Abdala, F. Lobo, I. Martínez Oliver, and S. Quinteros, collectors. MCN 1204-1215 (Paratypes). Same data as holotype. FML 23502-515. On Provintial Road 6, approximately 27 km S of intersection with RP 23 (41°25'43.25"S, 69°45'24"W). 924 m. 02/04/2009. Abdala, C.; F. Cruz; L. Moreno and M. Bonino cols.

Phymaturus spurcus: MCZ 14791(holotype). Huanuluan, Prov. de Rio Negro, Argentina. J. L. Peters col. 1920. MCZ 14914-15 (paratypes) same data of holotype. MCN 1238-40, 1244-49. Cerro frente Estancia Huanuluan. Ruta 23 a 22 km W de Jacobacci Abdala, C.; F. Lobo; I. Martinez; S. Quinteros cols. 10/2003. MVZ 188904-07. Depto. Ñorquinco, along Rimrock, 4 km S and 1 km E Alto del Escorial; elevation 1100 m. Prov. Río Negro, Argentina. R. Sage col. 25/02/1982. MCN 1385, 1387. Ojo de Agua. Ruta 6. Dpto. Ñorquinco, Prov. de Rio Negro,

Argentina. Abdala, C.; F. Lobo; I. Martinez Oliver; S. Quinteros cols. MCN 1590. Ruta prov. 6, 1 km NW de Ojo de Agua, 1141 m. Dpto. Ñorquinco, Prov. de Rio Negro, Argentina. L. Avila and M. Morando cols. 41°32'30"S, 69°51'33"W.

Phymaturus tenebrosus: MCN 1271 (Holotype). 20 km S of Cerro Alto, National Road Nº 40, Rio Negro, Argentina. C. Abdala, F. Lobo, I. Martínez Oliver, and S. Quinteros, col. MCN 1264-1270, 1272-73 (Paratypes). Same data as holotype. MCN 1591-1595, 1597-1599. Entre Bariloche y Pilcaniyeu, Prov. de Rio Negro, Argentina. N. Ibarguengoytia col. MCN 189-92 (CS) Entre Bariloche y Pilcaniyeu. Prov. de Rio Negro, Argentina. N. Ibargüengoytia col.

Phymaturus videlai: FML 21240-43. 7 km N of intersection national roads 40 and 26, 126 km N of Alto Rio Senguer. Río Senguer department, Chubut province, Argentina. C. Abdala, S. Quinteros, G. Scrocchi, F. Stazzonelli col. 11/29/2007.

Phymaturus verdugo: MCN 1958, 1960-61. Río El Gancho 4 km. from Las Loicas. 01/02/2006. Abdala, C.; R. Juárez; C. Robles col. Mendoza Province, Argentina. MCN 1973-77. 12.5 km from Las Loicas to Bardas Blancas, road to El Pehuenche. 01/02/2006. Abdala, C.; R. Juárez; C. Robles col. Mendoza Province, Argentina.

Phymaturus zapalensis: IBA 792 (type series, 4 specimens). Laguna Tern (L. Blanca). Prov. de Neuquen, Argentina. 06/01/1972. J. M. Cei, L. Cei and R. Ferreira cols. IBA 866-1 and 998-3 (2 specimens. 55 km S Piedra del Aguila, Neuquén, Argentina. 21/01/1973. SDSU 1985-1988. Argentina: Prov. Neuquén: Dpto Zapala: S. shore Laguna Blanca. R. E. Etheridge. 22/02/1983. MCN 1600-02 and MCN 1485-86 (CS). 1 km S del Salitral, Ruta nac. 40. Dpto. Catán Lil, Neuquén. 39°40.600'S, 70°36.925'W; 994 m. C. Abdala, R. E. Espinoza, and J. J. Wiens cols. 10/02/2001. SDSU 1989-90. Argentina: Prov. Neuquén: Dpto Zapala: S shore Laguna Blanca, 1275 m. W. E. Duellman. 18/12/1974. MVZ 232508-12. R. Prov. 46, 1580 m. 9.5 km S, 5 km Co Chachil, Dpto. Catan Lil, Prov. de Neuquen, Argentina. M. I. Christie col. 22/01/1996. MVZ 232514. Puesto de Control, 3.5 km N. de Co. de 1 laguna. PN Laguna Blanca (23°80', 56°83'). Dpto. Zapala, Prov. de Neuquen. Argentina. 1300 m. M. I. Christie col. 18/03/1994. MVZ 232515-16. Ruta provincial 46, Dpto. Zapala, Prov. De Neuquen, Argentina. M. I. Christie col. 16/03/1994. MVZ 232513. 1/2 km W Primeros Pinos, 1600 m. Dpto. Pirunches. Prov. de Neuquen. Argentina. M. I. Christie col. 20/01/1996. REE-SDSU 2451-2453 (DS). Margen sur de Laguna Blanca, Dpto. Zapala, Prov. de Neuquen. R. Etheridge col. 22/02/1983. MVZ 188908-10. Depto. Huiliches, rocks along Rio Malleo, 8 km N and 4 km E Junin de los Andes; elevation 800 m. Prov. Neuquén, Argentina R. Sage col. 23/11/1982. 39857104.